THE
SURGICAL CLINICS
OF
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the tube or from partial rupture, the diagnosis should be made, especially if there is a history of fainting But it is made in only a low percentage of the cases.

During the past ten years there have been 91 cases of ectopic on this service. Sixty-two (68 per cent) have been correctly diagnosed; 24 of the 91 cases were in collapse, all of which were diagnosed. Sixty-seven cases were of the ordinary variety, admitted in good or fair condition, with usually a typical history, but only 38 (56 per cent) were rightly diagnosed

The following table is an interesting summary of the errors in diagnosis as it shows both the number of times that ectopic was diagnosed as something else, and also the various conditions that were wrongly diagnosed as ectopic These figures are taken from the record kept of diagnostic errors reviewed in the weekly conferences. In ten years they have accumulated to an extent that makes them of considerable value

ERRORS IN DIAGNOSIS OF ECTOPIC GESTATION

Ectopic gestation, 91 cases, wrongly diagnosed as		Other pelvic conditions wrongly diagnosed as ectopic:	
Salpingitis or tubo-ovarian abscess ...	10	Salpingitis or tubo-ovarian abscess (310 cases)	11
Pelvic abscess	3	Pelvic abscess (37 cases)	2
Ovarian cyst	3	Ovarian cyst (123 cases)	5
Incomplete abortion	3	Incomplete abortion (148 cases)	2
Appendicitis, acute	5	Appendicitis and salpingitis	1
Fibroid	3	No lesion found (exploratory)	1
Cervical polyp	1		

Looking at the table we see that in 91 cases of ectopic the diagnosis of salpingitis or tubo-ovarian disease was made ten times, and on the other hand in 310 cases of salpingitis or tubo-ovarian abscess the diagnosis of ectopic was made eleven times. So with ovarian cyst, pelvic abscess, abortion, and appendicitis, the errors are shown both ways

Let us consider the diagnosis in the ordinary and more common cases, in which there has been partial rupture or tubal abortion and some extravasation of blood.

A careful history is essential and should indicate the diagnosis The most common, chief complaint has been pain—dull,

aching, distressing, or sharp and knife-like in recurrent attacks. The second complaint has been irregular vaginal bleeding In all but 4 of the cases some irregularity of menstruation was elicited. Either a period had been skipped or delayed, or had been scanty and delayed, and very often followed, after a varying interval, by prolonged spotting or scanty flow of dark blood. We have seen but one uterine cast. Any woman of childbearing age, complaining of pain in the lower abdomen, and giving a history of irregular menstruation and also spotting should be considered as having an ectopic gestation unless some other condition can be clearly demonstrated.

An additional reliable symptom is "gas," or abdominal distention, non-spastic, due probably to the interference with peristalsis by the extravasated blood.

The history should detail clearly the course or progress of the condition and will thereby give a picture that, as a rule, clinches the diagnosis. The course is irregular and intermittent. The patient is not consistently sick for ten days to three weeks or more as in inflammatory conditions. She is down today and up tomorrow—several times—feeling quite well between short attacks. This irregular course is typical, simulated only by the rare cases of partial torsion of the pedicle of an ovarian cyst.

A history of a previous period of sterility may be obtained, indicating some occlusion of the tubes. We have had a case with ectopic in both tubes successively, following the Gilliam operation, due to angulation of the tubes.

The examination may disclose a mass or may not. There is generally exquisite tenderness. The culdesac should be palpated very carefully for the putty-like feel of old clots. That is a most valuable sign. Temperature and leukocyte count do not help if there has been much, or even moderate, extravasation of blood. In the very early case, without extravasation, they are of value. Then a normal temperature and normal count may rule out inflammation.

The icterus index has been taken in a few cases lately and is principally of negative value. A low or normal reading in the presence of a mass reasonably rules out blood-clots. A high

reading with a good picture otherwise may be of slight positive value.

In the cases in collapse the pulse rate is considered in differentiating between shock due to loss of large amount of blood with possible continued bleeding and shock due principally to pain. The rapid weak pulse means hemorrhage. The slow weak pulse means shock alone.

The present case is a doubtful one, but symptoms and signs warrant exploration. She has had several children, the last, eighteen months ago, and there is nothing to suggest tubal occlusion. She is hazy about her menstrual history. She says her last period was normal, but she is not positive as to amount or regularity. She is an Italian and there is trouble in getting a clear history. She has been bleeding for three weeks, starting at the time when she should have menstruated. The bleeding is scant and rather bright. She has had no abdominal pain, only a backache, which she has had ever since her last childbirth. Examination shows an exquisitely tender, small mass in the culdesac. The uterus is anterior and normal in size. Temperature and leukocyte count are normal. Icterus index 7.5 (normal). She is referred from the dispensary as a possible early ectopic and will be explored as such.

A word as to the mortality. There have been 2 deaths in the 91 cases. The first death was also the first case of collapse in the series. She died on the third postoperative day, immediately after transfusion. She developed a hemiplegia. The other case died of peritonitis following rupture of an old infected ectopic sac. There have been 24 cases of collapse with the 1 death as described above. All these have been extremely ill. An ambulance service brings in such cases. All have been operated upon as soon as possible after admission. All have had a chance by coming to the operating table.

DR. POOL (operating): Having opened the abdomen through a Pfannenstiel incision we shall explore the pelvis. The diagnosis is suspected early ectopic. We shall see, now, if the points mentioned by Dr Hawks in his paper are borne out.

The right ovary and tube seem normal. The left ovary and

tube are normal, except for some congestion of the tube. It is peculiar that the pelvic examination showed bogginess back of the uterus. Examination now shows nothing abnormal there.

Let us see if there is any change in the uterus. There is not, except that perhaps it is a little enlarged.

We used to feel mortified on making a mistake in diagnosis. We now feel surprised if we make a correct one.

We all felt very uncertain as to whether this was an ectopic, but the circumstances, on the whole, justified such a suspicion. While the abdomen is open we shall remove the appendix.

QUESTION: What do you think to be the cause of the patient's irregular menstrual history and the bleeding?

ANSWER: Probably abortion. The question of curettage has been raised, but we do not believe she needs a curettage and I do not think it would be justifiable to curet her just to find out.[1]

OBSTRUCTION OF COMMON BILE-DUCT

The next patient we have this morning is a man who is desperately ill. He is to be transfused in the other room and then we shall explore him as quickly as possible. If any of you would like to witness the transfusion you are welcome to do so.

BLOOD TRANSFUSION BY DIRECT (GRAVIMETRIC) METHOD
DR. L. FISK

The method consists of a vein-to-vein coupling of donor and recipient by a 7-inch tube with needle at each end. No pump is used. Tourniquet is left on donor's arm, but not on recipient's arm, during the transfusion. Donor's table is higher than recipient's table.[2]

Recipient, Anthony G., about to undergo a laparotomy.

Procedure.—The donor lay on his table on a scale platform, his right arm being extended toward the recipient and downward at an angle of 40 degrees, supported by a narrow arm-rest. Recipient lay on his table, about 4 inches lower than donor. His

chosen arm, on an arm-rest, was extended horizontally so as to pass donor's arm without contact. The basilic veins of the two subjects were now only a few inches apart. The fields were painted with iodin. A tourniquet was applied to arm of donor and, temporarily, to arm of recipient Dr Graham then announced that the donor was balanced on the scale and read the exact position of the poise on the scale-beam Dr. Fisk inserted a No. 14 Fordyce needle in vein of recipient, pointing centrally. At once recipient's tourniquet was removed. A No. 13 Fordyce needle, to which was already attached a 7-inch rubber tube with an adapter at each end, was then inserted in donor's vein, pointing peripherally. While the blood was pouring from this tube it was attached without delay to the recipient's needle The transfusion then proceeded automatically, until Dr. Graham, watching the scale-beam, reported that the desired amount had passed over. Immediately the blood-tube was closed by compression, recipient's needle was removed, donor's tourniquet taken off, and donor's needle removed; the arms were elevated and small dressings were applied

Time, two and one-half minutes.   Quantity, 400 gm

DR. POOL: The case history of this patient is as follows·

Anthony G , admitted two days ago, with a temperature of 100° F.

Chief Complaint —Pain in right upper quadrant, aggravated by food

Present illness began two months ago, at which time he complained of a sharp, colicky pain in his right upper quadrant. This pain was localized and did not radiate   It was more severe after meals   He also felt nauseated at these times, but did not vomit   One month ago he noticed that he was becoming jaundiced   This has gradually increased during the past month

Past History —He had an attack of pain in his right upper quadrant one and a half years ago somewhat similar to that which he is now having.   No history of any other operations or illness could be obtained

Cardiorespiratory —No palpitation, tachycardia, precordial pain, or dyspnea.   No chronic cough, hemoptysis, and no night sweats.

Gastro-intestinal.—No indigestion or constipation. No hematemesis or melena. Appetite poor during present illness.

Genito-urinary.—Denies gonococcus and specific infection. No dysuria, polyuria, hematuria, or nocturia. He has had retention for the past month.

Nervous history negative.

Family History.—Has a wife and boy living and well. No history of chronic or infectious diseases.

Physical Examination.—A poorly developed, somewhat cachectic, very jaundiced man, lying quietly in bed, not suffering any acute pain. Head: Normal in size and shape. Eyes: Scleræ jaundiced, no strabismus, pupils regular, equal, and react to light and accommodation. Ears: No tenderness, no discharge. Nose: No obstruction. Throat: Teeth poor, tongue dry and coated. Pharynx appears normal. Tonsils atrophic. Neck: No palpable glandular enlargement. Chest is that of a middle-aged, emaciated Italian. It is poorly developed, but no striking abnormality noticed on inspection, save for the obvious jaundice. The ribs are unduly prominent. The respiratory excursions are normal and regular, although somewhat shallow. No degree of respiratory embarrassment noticed, no abnormal tactile fremitus elicited. On percussion anteriorly the liver dulness is at the upper border of the fourth rib, with flatness at the level of the sixth rib. Posteriorly the liver dulness is percussed at the level of the eighth rib in the midscapular line. No abnormal percussion is found over the aërated areas. On auscultation the breath and voice sounds are average normal and no râles are heard. The breath sounds are distinctly heard below the regions of liver dulness mentioned above.

Heart: Apex indistinctly felt. It is percussed in the fourth interspace $9\frac{1}{2}$ cm from the midsternal line, $6\frac{1}{2}$ in the third interspace. The right margin of the heart is not sharply outlined, the sounds at the apex are muffled and of poor quality. The rate is 90 and the rhythm quick. At the base the pulmonic and aortic second sounds are accentuated. No murmurs are heard.

Impression.—Normal lung signs, with slight (but not marked)

elevation of the right diaphragm, normal but weakly active heart.

Abdomen: Poor muscle tone Abdomen is held in spasm with definite rigidity in the right upper quadrant and in the right lumbar region There are no masses palpable. There is definite tenderness over the right upper quadrant, not apparently localized in the gall-bladder. The liver edge is palpable 1 fingerbreadth below the costal margin. Spleen and kidneys are not palpable Herniæ apertures normal

Rectal: Good sphincter tone, prostate normal, not tender, no masses palpable

Extremities: Apparently normal. Reflexes active and equal.

Fluoroscopic Examination.—Right diaphragm very high. Its excursions less than left. Stomach: Normal position, incomplete along lesser curvature at cardia, but not irregular, obviously deformed by same cause, as that producing change in diaphragm. There is a constant spasm at the antrum, but no defect This region is very tender, the cap fills with difficulty, indistinct and very narrow Duodenum appears in normal position, but not filled on account of scarcity of opaque mixture going through There is no evidence of ulcer or new growth The picture is one of inflammatory nature. Patient was very feeble and could not retain barium by rectum Several attempts failed

Laboratory, October 23, 1924:   October 24th·

Red cells,	3,100,000	
Hg,	60 per cent.	
White blood-cells,	40,000	49,000
Polynuclears,	91 per cent.	88 per cent.
Lymphocytes,	9 "	12 "

Wassermann, alcoholic, negative
Wassermann, cholesterin, negative

Coagulation time, four minutes
Bleeding time, three minutes

Urine + + + for bile, icterus index 150
Urea nitrogen 14 60 mg per 100 c c

Stools, light tan, liquid
Bile, trace
Blood, negative
Parasites, negative

Summary.—This patient was admitted to the hospital two days ago. His present illness began two months ago, with a sharp localized pain in the right upper quadrant. It was a pain which did not radiate and which was more severe after meals. The patient was nauseated, but did not vomit. This pain was first noticed two months ago. Then, a month later, the patient noticed that he was becoming jaundiced, gradually increasing in intensity. There were no masses palpable, but a definite tenderness over the right upper quadrant, not obviously in the gall-bladder. The spleen and kidneys were not palpable. Our impression is that he is suffering from stone in common duct and cholangeitis. We must relieve him. He has been given a transfusion and now I am going to explore the upper right quadrant.

Severe jaundice cases are about the worst risks we have. The icterus index of this patient is 150. In intestinal obstruction cases, if we do not immediately find the cause, we drain the bowel and determine and treat the cause subsequently. In such cases as this it is also a great mistake to do an extensive operation. It is best to relieve the jaundice, reserving radical surgery for a later operation. Rapidly palpating the region of head of pancreas and common duct, I find no stones. I feel no neoplasm. It is always a temptation to do too much exploring in such cases. When he clears up, if he does, we can go in again, if necessary. We therefore drain the gall-bladder (cholecystostomy) which is distended. We will have the fluid which is removed through the aspirator cultured.

The patient is in sufficiently good shape to explore a little further. I feel along the common duct a firm mass about 1½ inches long. It is obviously not a stone, but a neoplasm. This has produced the obstruction which led to jaundice and later to infection. We have had only a few cases of carcinoma of the duct.

We have used ethylene gas entirely. It seems to give less postoperative trouble and discomfort. The only bleeding is in the lower angle outside the pertoneum. Jaundice cases, of course, often bleed excessively and postoperative bleeding, even

of alarming degree, is not infrequent. Although we employ calcium lactate to limit this, we pin our faith much more on blood transfusion. The duct was so distended when I first went in that I could not appreciate what was in it[1]

In planning the New York clinics the attempt was made to avoid operative orgies, showing only a few illustrative operations. This is our last operation. Dr. Holland will now discuss gastro-enterostomy from the viewpoint of the fluoroscopist.

NOTES ON GASTRO-ENTEROSTOMY FOR DUODENAL ULCER

DR. ARTHUR L. HOLLAND

It has been my privilege to examine many of the patients who have been operated upon by Dr. Pool for duodenal ulcer, both before operation and at varying periods subsequently. In our regular routine here at this hospital, and formerly at the Cornell Medical College Clinic, I have enjoyed the same privilege in similar cases sent in by other surgeons.

While I cannot at this time give you any facts of unusual interest based on the findings in these cases, the accumulated experience has enabled me to form opinions, or rather impressions, regarding the value of the operation of gastro-enterostomy and its application to the different types of duodenal ulcer.

The responsibility of the diagnostician in these cases is considerable. He must differentiate postpyloric from prepyloric ulcers. The prepyloric lesions belong to the surgeon—not because such an ulcer might later degenerate into cancer, but because one can never be sure if a defect in this place is a simple ulcer or a carcinoma. I advise surgical treatment here, despite the fact that prepyloric ulcers are treated fairly successfully through conservative medical means.

Primary cancer does not occur on the distal side of the valve, or so rarely that it does not count. With this fear removed, we

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[1] Following operation patient grew gradually weaker and died on the ninth postoperative day. Autopsy was not permitted.

have then only to determine which form of treatment will offer the most in a given case of duodenal ulcer.

The results of the medical treatment of duodenal ulcers are excellent, fair, or unsatisfactory, according to the extent of the involvement and the effect the lesion has had upon the gastric functions. We have found that when such an ulcer does not obstruct in any way, the conservative treatment, if carefully followed, is satisfactory. Exacerbations do occur, but these are comparatively rare and do not seriously inconvenience the patient. On the other hand, it has been noted that the results of gastro-enterostomies in these unobstructed cases are often questionable. This is easy to understand. Gastro-enterostomy stomas tend to close spontaneously when intragastric tension is reduced too much. With a patent, relaxed pylorus and a gastro-enterostomy stoma draining the fundus, these conditions are met. With a closed stoma, conditions are brought back to where they were before operation, with the added embarrassment to duodenal peristalsis that the hitching up of the jejunum to the fundus is bound to bring about.

Mackenzie[1] has taught us, and his observations have been amply confirmed, that the abdominal viscera are insensible to ordinary forms of irritation, such as cutting, pinching, or burning. A hollow viscus, however, resents alterations in the tension which is normal to it (Sherrington[2]), and in a roundabout way through the sympathetics and superficial and muscular reflexes will register a protest in pain when tension is increased beyond a certain limit.

In the interests of intestinal motility the intratubular tension is normally highest in the duodenum. This gradually diminishes down to the terminal ileum where the intratubular tension is lowest. It may readily be seen that the fixing of the jejunum in a case in which an anastomosis has failed may easily cause an imbalance or duodenal tension and that symptoms are thus made possible. Under these conditions the relighting of ulcer activity or marginal ulcer are not the only

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[1] Symptoms and Their Interpretation, Shaw & Son, London, 1920.
[2] Postural Activity of Muscle and Nerve, Brain, Part 3, vol 38.

explanations for recurrence of pain and other postoperative symptoms presented.

All this, however, is more or less speculative We have learned from our fluoroscopic and clinical experiences in these investigations that those ulcers respond the best to gastro-enterostomies when obstruction of some degree has been demonstrated before operation

Dr. Pool has been exceedingly careful to select for operation those cases in which the indications for surgery have been unquestionable, and I attribute his high percentage of satisfactory results to this fact as well as to his perfected technic.

It may be stated, arbitrarily perhaps, that those gastro-enterostomy stomas placed in the most dependent portion of the stomach function the best A stoma that is not thus placed provides for puddling In some of the cases where puddling in the stomach has been observed, symptoms of indigestion have been pronounced. Several times we have found that stomas placed in the antrum or near it have become occluded

There seems to be a happy medium for the size of a stoma which insures the most satisfactory function An excessively large one does not give entire satisfaction, probably not so much because of loss in gastric digestion, although this must be considered, but in the crowding of the jejunum and tube beyond, which are thrown into confusion by the resulting distention. Here increased tension may be responsible for unpleasant sensations

A small stoma often seems to give good immediate results, but the chances of occlusion later are naturally great This has happened in several cases that I can remember

A very short or no-loop arrangement has proved less trouble later than a loop in which bile can puddle, or a vicious circle operate It is not sufficiently realized how much of postoperative indigestion results from this accumulation of bile in the proximal loop. The back-tracking of bile and pancreatic juice through reverse peristalsis in the duodenum is sufficient to account for nausea and sensations of pressure

Adhesions involving the jejunum beyond the stoma have

occurred in several cases. **In two, the distal jejunum was fixed up against the stomach, doubling back upon itself.** There was puddling in this acute loop. These patients did badly.

We have seen the results of hasty surgery in several curious errors. One patient had been sent to a tuberculosis sanitarium soon after a gastro-enterostomy for duodenal ulcer, because he lost weight rapidly and coughed considerably. After more than a year spent in bed he was sent to us and we found that the surgeon had selected a place for the anastomosis in the ileum about 8 inches from the ileocecal valve.

Fig. 143.—Case I. x-Ray of stomach before operation.

Fig. 143A.—Case I. x-Ray of stomach after operation (midgastric resection).

Another surgeon had picked out the transverse colon for the anastomosis. The patient died.

Dr. Eugene H. Pool

It is felt with regard to gastro-enterostomy that it should not be employed as a routine for duodenal ulcers. Patients develop symptoms after gastro-enterostomies in about 25 per cent. of the cases, sometimes a year or more after the operation—discomfort, acid eructations, diarrhea, etc.—and 2 to 3

per cent develop marginal ulcers near the site of the anastomosis. Therefore, if you are going to have 1 in every 4 or 5 cases a symptomatic failure, you are not following an ideal procedure. This is especially true if you are going to subject 1 out of every 25 to a marginal ulcer, than which there is nothing more difficult to cure

In duodenal ulcers, if some retention at the end of six hours is found, you may feel that a gastro-enterostomy will almost

Fig 144 —x-Ray of gastro-intestinal tract   Note opaque meal filling diverticulum.

always effect a cure. If there is no retention, the case is carefully considered and at the operation we endeavor to find some other method than gastro-enterostomy by which to treat the patient. We have tried pyloroplastics; 7 out of the 9 cases of Finney pyloroplasty followed were symptomatic failures, that is, were not cured of all symptoms Such may not be the average in the hands of more competent surgeons, but I believe this is the fair result of the average surgeon

If we have an hour-glass stomach, we usually do a midgastric resection. We have a very interesting case here, a woman fifty-one years of age, who came to us on March 8, 1924, with a history of epigastric discomfort, sour eructations, and vomiting, beginning six months before admission. She had an appendectomy in 1918. She had been having a great deal of gastric dis-
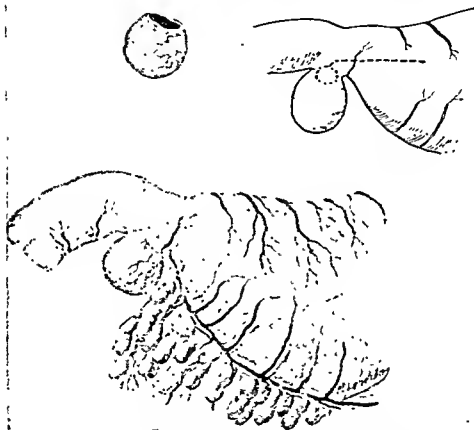

Fig. 144A.—Case II. Drawing showing relative size and position of diverticulum with line of operative incision.

tress. An x-ray of her is here shown (Figs. 143 and 143A). A midgastric resection was done and patient is free of symptoms to date.

To illustrate the value of the fluoroscope, let me cite a case who complained of severe epigastric pain and was fluoroscoped

by Dr. Holland, who reported "This case has a small ulcer of the first part, a little diverticulum of the third part." We went in, and to my amazement the patient had both these lesions

The next patient suffered with epigastric pain and a diverticulum (Figs 145, 146).

We did a modified Horsley, deflecting the incision at the duodenal end, somewhat downward, so as to excise the diverticulum The patient has been perfectly well since operation.

Fig 145 —x-Ray of gastro-intestinal tract Note barium streaking in cecum.

We have had some mortifying cases The case next shown on the screen is instructive Here we went in after careful study of the case under the diagnosis of gall-stones. We found a negative gall-bladder, duodenum, and stomach Then we put our hand down and felt a mass in the cecum The lesion was a carcinoma of the cecum We performed a resection and the woman is well. The point is that in studying this case—and we studied it very carefully—we focused our attention on the right upper quadrant, where all her symptoms were localized We did not give a barium enema If we had done this we should have

spotted the trouble at once. We often show this slide (Fig. 145) to visiting surgeons and they usually fail to recognize the trouble, but if you will look at it carefully on the screen you will see the distended cecal outline with the barium streaking. In this case we seemed to make a complete examination. We kept our minds stupidly on the place to which she referred her symptoms, whereas the trouble was evident had we looked carefully and with open eyes. We would pick up more early carcinomata of the large intestine if we did not focus our attention too much on the more obvious things—appendix, ulcer, gall-bladder, etc.

We have here a case of perforating ulcer, six days post-operative. He was seized suddenly with pain in the epigastric region while riding in the subway. He was brought into the hospital and operated on within six hours. He is getting along very well. Simple inversion of the ulcer without gastro-enterostomy. This man was stricken with very sudden acute, localized pain in the epigastric region. The pain was sufficiently severe to double him up. This is the typical history of these cases, and when the pain is sharp and severe like that the patients come to the hospital immediately, are operated immediately, and practically all of them recover.

We show in contrast to this case a patient aged twenty-nine, who, twenty-four hours before admission to the hospital, suffered cramp-like pain in the abdomen which had persisted more or less for the past week, but which had not been sufficient in its severity to bring him to the hospital until the occurrence of the sharp pain with collapse a week later.

This case came in with tenderness over the entire abdomen, most marked over appendix region. Acute appendicitis was the ante-operative diagnosis because of the gradual onset of pain and because of its localization over the appendix region. We went in on him with some questioning, but acute appendicitis was the diagnosis. The operator found some irritation of the right colon. The appendix appeared congested. There was a small amount of cloudy fluid in this region. However, we were not satisfied with these findings and so extended the incision,

been through a terrible train of trouble. He is now twenty-six years of age At the age of twelve he had abdominal pain for a week or so, then vomiting of considerable amounts of blood He was well after that until nineteen years of age, then vomited blood again, coming here in a state of extreme collapse After a number of tests and study over a long period, we came to the conclusion it was a case of splenic anemia. There are good reasons to believe that splenic anemia and Banti's disease are one and the same thing, and that Banti's disease is a late stage of splenic anemia Splenic anemia is an unexplained condition presenting enlargement of the spleen, secondary anemia, and in the later stages cirrhosis of the liver and its complications.

The spleen in this young man was taken out He did pretty well until 1923, four or five years later Then he was taken to St Luke's Hospital with a profound anemia, vomiting blood, and passing blood by rectum. The diagnosis of Banti's disease was made. He was given a transfusion of blood A few weeks later he was back there with the same condition: profound anemia and vomiting blood He was again transfused

He came to us later, vomitung blood, passing blood by rectum, and with profound anemia We accepted the fact that it was Banti's disease, that he probably had a cirrhosis of the liver, and that operation would not benefit him We explained to him that a mistake in diagnosis is made at times, and therefore the only way to find out whether he had, as we suspected, a fatal condition that could not be improved or something that could be helped, was to open him up We accordingly operated He did not have Banti's disease His liver was perfectly normal in appearance To prove this we took a piece out and histologically it proved normal The first thing we noticed on opening the abdomen was an enormous vein standing out, distended like a loop, just above the duodenum It was about 5 mm. in diameter. In the anterior wall of duodenum we found some thickening To demonstrate positively whether there was an ulcer, we opened the duodenum There was no ulcer. We closed this opening. There was an indurated mass above the duodenum reaching over toward the duodenum. Tracing this

out, it ran along just beneath the lesser curvature corresponding to the course of the splenic vein. We took some tissue for examination and this was reported as inflammatory, with vessels in it, partly obstructed by organized thrombi. He presumably had a retrograde thrombosis of the splenic vein, with periphlebitis. The obstruction caused the dilatation of the tributaries and I have no doubt this was the cause of the postoperative bleeding into the stomach. This did not explain his original bleeding, however. He presumably had a splenic anemia, benefited by splenectomy; the second bleeding was due to other causes than the disease. We assured him that he did not have cirrhosis, and that his obstruction was due to a mechanical process.

Case II is a woman aged forty-six, who came in September 26, 1924, complaining of pain in the abdomen for two years. She came from the West Indies, with a history of repeated attacks of malaria. Her father is supposed to have died of paresis

Examination showed a marked anemia, hemoglobin 45 per cent., with low color index, and in the differential count of the white cells a striking increase in the mononuclear cells. We thought with certainty we had the splenomegaly which is described as accompanying chronic malaria. We excluded as far as we could syphilitic causes and then attempted to confirm the diagnosis of malaria. Blood films made at various times and after the administration of adrenalin failed to show parasites, and finally a splenic puncture was done. Material from this also failed to show parasites. However, we were not wholly convinced by this inability to find parasites, as will be shown by the next case.

Case III.—This patient came in with an enormous abdomen, perfectly rounded. He had positive echinococcus complement-fixation tests. He is a Hebrew, aged twenty-four, born in Palestine, and admitted into this hospital December 29, 1923. This case is of interest: First, because of the diagnosis. Echinococcus complement-fixation tests were twice strongly positive and the

condition was supposed to be an echinococcus cyst This was supported by the x-ray plates Second, a large spleen was removed, which on cut-section did not suggest malaria. Third, no manifestations of malaria were present nor were plasmodia found before operation, but on eighth day following operation chills and high fever occurred and continued daily for five days, when tertian malarial parasites were found Quinin was administered with immediate clearing up of the symptoms

The case history of Case III on admission was as follows: At irregular intervals during the last three years he had had fever and chills, the attacks not occurring more frequently than every two weeks Lately he had noticed some swelling of the abdomen. He had occasional pain in the back. His appetite was poor and he vomited heavy foods He had grown weaker and has lost 15 to 20 pounds in the past year

The physical examination revealed lungs, percussion note normal throughout, except on left side, where there was moderate dulness from the angle of the scapula down This dulness was apparently due to enlargement of the spleen Abdomen, full, rounded. A mass was felt in left side, the lower pole of which was at the level of the anterior superior spine. It extended over 5 cm. beyond the midline and fused with the liver on the right. The liver edge could not be made out and there was no tenderness in the abdomen

The x-ray reports suggested tumor in the left side of the abdomen Barium enema showed a low transverse colon which was in a spastic condition. The hepatic flexure appeared normal The diaphragm appeared normal in height and contour

The fluoroscopic reports on December 31, 1923 were normal chest, stomach represented by a sausage-shaped bag hung obliquely from left upper to left lower abdomen This appearance seemed to be due to compression by two masses, one representing the liver, the other the enlarged spleen. The stomach itself seemed normal On January 7, 1924, with the barium enema, no obstruction was seen. The sigmoid was moderately redundant. There was a low splenic flexure and a very low transverse colon skirting the edge of the mass, which seemed to

occupy the epigastrium and part of the left hypochondrium. The relation of the mass suggested that it might be the left lobe of the liver, very much enlarged.

The blood-count on December 30th was hemoglobin 70 per cent., white blood-cells 6600, polynuclears 47 per cent., lymphocytes 45 per cent., mononuclears 3 per cent., transitionals 3 per cent., eosinophils 2 per cent., red blood-cells 4,008,000. The Wassermann was negative. Malaria hunts negative. Echinococcus fixation positive on two examinations.

Operation was performed January 14, 1924—splenectomy. A left rectus incision was made. The spleen was enormously enlarged, reaching well across the midline. The spleen presented adhesions running from it to diaphragm. The lower pole was delivered and the pedicle ligated from below upward and cut between ligatures. The stomach was in close apposition to the pedicle. It was necessary in ligating to displace the stomach carefully, and even so the ligatures had to be placed very close to it. The tail of the pancreas, likewise, reached into the pedicle and was cut to a slight extent in the clamp and ligature. It was impossible to displace the pancreas entirely. As the pedicle was cut and freed, the spleen was delivered and removed. The peritoneal edges were infolded with suture so as to leave no surface uncovered. A counteropening was made in the left subcostal region and a dressed tube introduced. This was done on account of the apparent injury to the tail of the pancreas, which indicated drainage.

Pathologic Report (January 26, 1924).—Specimen consists of a spleen from whose pedicle some of the clamps have been displaced, so that much of its contained blood has escaped. In this condition it weighs 2100 grams and measures 10 by 8 by 27 cm. Its shape is normal. Before the loss of blood the capsule was tense. The surface of the capsule is slightly roughened by numerous small areas of fibrin deposit and at one pole is a definite band of adhesions. For the most part these fibrin deposits are small, slightly raised, but a few show shaggy extension of fibrin. The color is rather dark, bluish red. On section, the consistence is firm and the cut surface smooth, representing

condition was supposed to be an echinococcus cyst. This was supported by the x-ray plates. Second, a large spleen was removed, which on cut-section did not suggest malaria Third, no manifestations of malaria were present nor were plasmodia found before operation, but on eighth day following operation chills and high fever occurred and continued daily for five days, when tertian malarial parasites were found Quinin was administered with immediate clearing up of the symptoms

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splenocytes, and in addition there are seen a few very large cells with abundant cytoplasm which may correspond to the cells described in the section. There is, however, no characteristic by which they may be recognized when stained with oxidase stain. A good proportion of the cells show reacting granules. It is doubtful what these cells are. It seems improbable that there should be so many myeloblasts in the spleen without any cells recognized as the more mature myelocytes. It seems more probable, therefore, that these cells react with the oxidase stain similarly to the large mononuclears in the circulating blood in that they, too, are apt to show oxidase granules. If this be true these cells are more probably members of the endothelial group. Prolonged search fails to reveal any malarial parasites in these films.

Microscopic Examination (Fig. 146).—The capsule and trabeculæ are not increased in thickness. The follicles are present in approximately normal numbers and are rather large, being readily seen in the section by the naked eye. They are for the most part similar in structure, being composed of a narrow rim of densely packed, deeply staining, small round-cells and a large, paler center of looser structure. The "central artery" is situated well to the periphery of the follicle, sometimes separated from it by a thin band of pulp tissue. The walls of this vessel are thickened and the lumen constricted. Not infrequently it appears to be completely occluded. Occasionally a follicle is seen in which no vessel can be discovered. The cells in the periphery are arranged chiefly in cords and appear to be normal, small lymphocytes. In the less dense center of the follicle there are relatively fewer of the "germinal center" type of cell than are found in the normal follicle. There are many cells of the type of small lymphocyte and a very few large cells with somewhat acidophilic cytoplasm, containing one or two nuclei. The cytoplasm is abundant and shows no stippling or streaking. The cells are, as a rule, round or oval, but not a few are irregularly polygonal in shape and present irregular prolongations. Occasionally fine capillaries are to be found in the central area of the follicle. A few mitotic figures may be seen. In some of them the

appearance suggests a thickening of the reticulum, though this
is not very definite. The splenic pulp is marked by an intense
congestion, red blood-cells being packed not only in the venous
sinuses but also in the pulp cords. There is an increase in the
fibrous tissue in the pulp. The walls of the sinuses are thick-
ened. Normal splenocytes are present, together with the usual
white cells from the blood. The number of eosinophils appears
to be normal. In addition, there are many large cells men-
tioned above. They are found both in the venous sinuses and
in the pulp cords. They are large oval or polygonal cells with
abundant, eosinophilic granular cytoplasm. The granulation is
very fine and does not resemble the stippling or streaking seen
in "Gaucher" cells. The nuclei are round or oval, and there
are frequently two, rarely more, in a cell. These cells seem to
be phagocytic, for many of them appear to contain red cells.
Occasionally one finds vacuoli in these cells. They appear to
be endothelial cells. There is very little pigment in this spleen,
rather less than is often seen in a normal spleen. The accessory
spleen represents changes identical with those found in the
main organ, except that possibly it contains more malpighian
bodies in proportion to its size. The lesion described above is
not one recognized as characteristic of any known disease con-
dition. No diagnosis can be made, but it may be summarized as
splenomegaly, without anemia, showing fibrosis, congestion, en-
dothelial hyperplasia, and changes in the follicular structure.

Postoperatively, patient ran a temperature. There was some
infection along the drainage tract. From the eighth to thirteenth
days postoperative patient had daily rigors, with chill and
sweat. Patient's highest temperature was 105° F, which fol-
lowed a chill on January 26th. Blood cultures negative.

January 26, 1924: Malarial parasites in blood smears were
found in blood examination which were done at the height of
one of the rigors. These parasites were of a tertian form. Blood
smears taken on the medical side, which were examined with
special reference to malarial parasites, were again proved to be
negative upon a second examination after the diagnosis of malaria
had been made from later smears. After the administration of

quinin was commenced the temperature remained normal and clinical improvement, both objective and subjective, was very marked. Follow-up reports are satisfactory.

QUESTION: What did you do by the operation?

DR. POOL: Apparently we squeezed out organisms of malaria from the spleen into the blood.
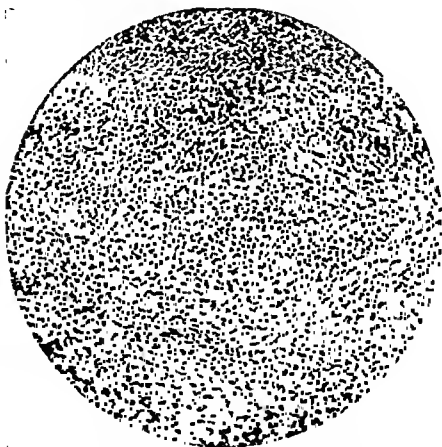

Fig. 147.—Photomicrograph of section of spleen.

DR. STILLMAN (going back to Case II).—In spite of the fact that we were unable to prove the presence of malarial parasites, we went ahead to operation. The justification of removal of the spleen was that the symptoms seemed to be due entirely to the presence of this large mass in the abdomen, with a great deal of pain and discomfort associated with it, so that she was unable to carry on her usual activities. The spleen

proved to be unusually large, weighing 2265 grams. Patient was discharged November 12, 1924 in excellent shape

On section the spleen was hard, contained a good deal of calcareous matter, apparently deposited in some of the smaller blood-vessels. On microscopic examination (Fig. 147) there was a definite thickening of the capsule and a marked increase in the amount of connective tissue distributed throughout the organ, but none of the pigment we have been taught to expect in spleens in chronic malaria was present. There were collections of large and small mononuclear cells throughout the organ, some with oval nuclei, not corresponding to the follicles or limited to them This hyperplasia of mononuclear cells was very probably associated in this case with the number of mononuclear cells in the blood-picture.

Having looked over this section, we went back to look over the sections of the spleen in Case III, just mentioned, who did have malaria. We found in that spleen not so much fibrosis but also a marked hyperplasia of the mononuclear elements, but of a somewhat different type One may speculate as to what these spleens are. The fibrosis suggests inflammatory origin. The hyperplasia, especially in this patient, suggests an early neoplastic process, but the fact that it is not limited to one area, but is distributed generally through the spleen, together with the large size of the spleen, does not seem to fit in with the idea of an early neoplastic process, but suggests rather the possibility of some infectious or toxic process.

ECHINOCOCCUS CYST

Dr. Pool: I show these patients to bring out certain facts in regard to drainage. Complete cure in such cases demands very free prolonged drainage of the cyst, so that no area of the tract in liver becomes separated from main tract with resulting slow recurrence of the abscess and indefinite persistence of fistula.

Case IV.—Alfonso T., an Italian, married, a janitor, aged thirty-three.

This patient is shown to illustrate the sequelæ from insufficient and imperfect drainage at the original operation.

Present History.—Chief complaint on admission, discharging sinus below ribs on right side. Eight years before he began to have acute attacks of severe pain in right upper quadrant. No radiation. During attacks was weak and nauseated. Never vomited He was also mildly jaundiced On September 9, 1920 he was operated upon at another hospital, after which the wound drained for a long time. A secondary suture was done, but sinus has persisted.

Past History.—Malaria at eight years

Physical Examination.—Well developed and nourished. Slightly pale. Cervical, axillary, and inguinal nodes enlarged. Abdomen: Liver and spleen not felt. There is a three-sided shaped scar in right upper quadrant with a discharging sinus in center of upper horizontal scar. This sinus is 1 cm. in diameter and 3 cm to right of midline. Between the two horizontal scars there is a hernia.

Laboratory Tests—Wassermann negative, urine negative, x-ray negative, stool negative for parasites.

Operation (March 5, 1921; Dr. Pool).—Sinus injected with methylene-blue. Elliptic incision Tract removed. Sinus deep down was curetted and portion of cyst wall removed. One rubber tube surrounded by two strips of packing inserted for drainage. Anesthetic, gas-oxygen.

Postoperative Course.—Wound drained profuse bloody discharge until March 14th, when patient was discharged to Out-Patient Department with a rubber tube and gauze in wound. He was dressed there daily. About April 1st the tube was removed Two days later he became ill with chills and high fever. Vomited a few times. Some pain in wound five days later; he came jaundiced. His wound was reopened and a large amount of pus was evacuated. On April 9th he was readmitted to hospital.

Physical Examination.—Markedly jaundiced. Temperature 103.4° F. The sinus was discharging a thick greenish fluid. Liver region not tender. W. B. C., 17,000; polys., 88 per cent.;

urine, albumin +, bile +++. *x*-Ray, high level of right diaphragm   Coagulation time, six minutes

Remained in hospital until April 29th, during which time the sinus was drained by large rubber tubes   Wound draining profusely.   Referred to Out-Patient Department   Was treated in Out-Patient Department until May 2, 1921, when he began to have fever, pain in right side, and chills   No jaundice   Wound discharging only moderately.   Tube still in place.

Readmitted to hospital May 5, 1921.

Physical Examination —Slightly icteric   Right chest showed dulness in lower right axilla to level of nipple, râles at right base, tender in lower right axilla   Slight tenderness in liver region. Temperature 103° F , pulse 108, respiration 20.   *x*-Ray revealed high level of right diaphragm, suggestive of pathologic condition below diaphragm   Blood-count: R B C , 4,740,000; Hgb., 60, W. B. C., 11,400; polys , 70 per cent   Urine, trace of bile

Operation (May 9, 1921, Dr Pool); *Subphrenic Abscess* — Finger inserted through wound and in depth an abscess 3 inches in diameter was found   Counteropening made in lumbar region   Through-and-through tube inserted

Patient ran a mildly septic course, temperature ranging from 99° to 103 6° F.   On June 6th he was again explored   Finger inserted into tract, and several large communicating pockets filled with grumous material opened.   Packing inserted for bleeding.   Apparently liver abscess

Culture of material showed Staphylococcus aureus.   Was dressed daily.   Profuse discharge   Was discharged from hospital July 13, 1921, with discharging sinuses.

Follow-up —Called at Out-Patient Department for dressings   Gained 15 pounds during first six months   Resumed work December, 1922   During his various follow-up visits he complained occasionally of pain in region of liver   Sinuses persisted and discharged a moderate amount of fluid

September 7, 1924: Feels well.   Wound becomes inflamed occasionally   Appetite good   Bowels regular.   Is working hard   Weight stationary.   Still has anterior and posterior sinuses.

Case V.—Lucio L., Italian, female, single, age twenty-two. Admitted March 11, 1922. This case illustrates proper method of drainage and result therefrom.

Chief Complaint.—Pain in right upper quadrant of two years' duration.

Present Illness.—For past two years has had pain of dull character in right upper quadrant, radiating to back and right shoulder. Pain occurs at intervals of from two to six months. Occasionally nauseated. No vomiting. No jaundice. Appetite and digestion good. Has had several attacks of diarrhea. Is weak and has dyspnea on exertion.

Past history negative. Menses all right until seven months ago, when they stopped.

Family history negative.

Physical Examination.—Well nourished. No jaundice. Right chest: Flatness to angle of scapula with absent fremitus and breath sounds Liver dulness up to third rib anteriorly. Heart: Displaced upward and to left. Breasts: Small; firm, freely movable tumor in left breast. Abdomen: Whole upper abdomen filled with tumor mass, seems related to liver, descends with inspiration and extends to umbilicus. Mass is dull and not tender.

Laboratory Tests.—Wassermann negative R. B. C., 5,940,-000; Hgb , 95 per cent.; W. B C., 8520; eosinophils, 4.6 per cent.; polys., 63 per cent. Urine, negative. Temperature 99.4° F. Echinococcus fixation positive. x-Ray: Abnormally high right diaphragm level, suggestive of subdiaphragmatic or liver involvement. Pneumoperitoneum: Enlarged high liver on right side. No fluid between liver and diaphragm. Suggestive large spleen.

First Operation (March 15th).—Exploration. Incision to right of midline. Liver cyst well exposed but not opened. Spleen felt. No adhesions about it. No definite cyst here. Cyst incorporated in liver. Edges packed. To be opened in few days.

Second Operation (March 18th).—Cyst aspirated, 5000 c.c. clear thin fluid aspirated Whole lining membrane removed en masse; 8 daughter cysts 1 to 10 cm. in diameter removed. Cyst

apparently involved whole right lobe of liver   Counteropening made in right flank below last rib.   Large through-and-through tube.   A very large Mikulicz drain was also introduced, with the idea of the cavity in liver gradually contracting down around the drain to form a straight tract

Postoperative Course —Had profuse serous discharge.   Drain shortened very gradually.   Irrigated with Dakin's solution, March 31st, Mikulicz drain removed.   Wound on Carrel-Dakin.

April 7th·   Intradermal test with echinococcus fluid, using 1/100 c c. undiluted.   Strongly positive with urticarial wheal and typical pseudopods   Wound Dakinized until April 28, 1922, when patient was discharged to Out-Patient Department. At this time there was a through-and-through drainage-tube.   Cavity gradually contracting down and discharging profusely

Pathologic Report —Considerable quantity of white membrane.   Inner surface sprinkled with tiny raised dots   Microscopic: Structure of echinococcus cyst, but no scolices or hooklets

Follow-up   Called regularly for dressings   An attempt was made to close cavity very slowly.

January 21, 1923·   Feels well, occasional pains in liver region   Has gained 20 pounds   All wounds healed.   No tenderness.   No masses   No hernia

January 27, 1924   Feels very well   Has small ventral hernia

Case VI.—Martin E , male, age thirty-three, Austrian, married, cook.   Admitted to hospital, April 11, 1924.

Chief Complaint —Pain in lower thoracic and upper lumbar spine   Duration, four months

Present Illness.—Four months ago patient noticed that when he lifted anything he experienced pain in lower right chest and back   This gradually became worse, until he was unable to bend forward to pick up an object   He was compelled to stop work   Pain radiates around to right upper quadrant and is aggravated by physical exertion   Is very weak.   Two months ago began to expectorate a little blood   Has frequent night

sweats. No nausea on vomiting. Bowels regular. No urinary disturbances.

Past History.—Born in Jugo Slavia. Lived there in 1921 to 1923; otherwise negative.

Personal and *family history* negative.

Physical Examination.—Sallow, well-nourished male, appears chronically ill. Teeth poor. Tonsils infected. Abdomen: Marked fulness in right upper half of abdomen. Liver is felt to occupy this area of fulness. Smooth, rounded, firm edge. Another mass is felt in splenic area. This mass is tender and the overlying musculature is slightly rigid. Otherwise negative.

Laboratory Tests.—Icterus index, 3. Urine, negative. R. B. C., 3,784,000; Hgb. 75 per cent.; W. B. C., 11,200; polys., 65 per cent ; lymph., 22 per cent.; large monos., 12 per cent.; eosinophils, 2 per cent No malarial parasites. Echinococcus complement fixation unsatisfactory. Liver function test, 20 per cent. of phenoltetrachlorphthalein at fifteen minutes; 13 per cent. phenoltetrachlorphthalein at one hour, indicating impairment of liver function. Stool blood-marked. Wassermann negative. x-Ray, large liver.

First Operation (April 28, 1914).—Right rectus incision. Enormous liver; elastic. Aspirated 8 c.c. of clear fluid removed. Wound packed. Cyst to be opened as soon as adhesions have formed.

Second Operation (April 29, 1924)—Packing not disturbed. Needle inserted to remove fluid, but smaller cysts obstructed it. The liver wound was then enlarged 2 inches and cyst evacuated. Perhaps 100 cysts, varying from a few millimeters to 4 cm. removed. Also large pieces of cyst wall. Wound drained with tube and three pieces of gauze.

Pathologic Report.—Cyst wall showed presence of hooklets and typical chitinous wall. No scolices found.

Postoperative Course.—On three separate occasions the patient was taken to the operating room and the packing gradually loosened. It was removed entirely May 17th and fresh gauze introduced. In the meantime daily dressings were done. Ran a fairly smooth postoperative course, temperature going

up on two occasions to 103 4° F   Discharged June 25th to Out-
Patient Department with a large rubber tube extending into
liver for distance of 3 to 4 inches

When first admitted, after being completely worked up, the
general opinion was that this patient had cirrhosis of the liver,
and he was then transferred to the medical service. As the pain
persisted and the patient appeared ill, exploration was done with
the above findings

Follow-up —Has been calling at the Out-patient Department
for dressings   The sinus tract has gradually closed down   The
wound is now superficial, very little discharge. Patient feels and
looks well, and has resumed his work.

TUMOR OF THE BREAST—INNOCENT—LOCAL ANES-THESIA

THIS patient is thirty-five years of age and has been complaining of a tumor in her left breast for about three years. The tumor itself has never been productive of pain and is not adherent to the skin. In other words it produces no trouble such as is characteristic of malignancy, is freely movable, and should be one of the innocent variety, such as an adenofibroma or a neurofibroma, and in all probability is an intracanalicular or pericanalicular adenofibroma. In view of there not being any further nodulation in the breast and no discharge from the nipple on gentle massage from periphery to center, we exclude cystadenomatous degeneration.

The operation is being done under local anesthesia; novocain, $\frac{1}{2}$ of 1 per cent. I am cutting wide of the tumor itself so as to preserve the capsule, in the event of its being an encapsulated growth and to obviate entering into any malignant tissue in the event of an infiltration extending beyond the outline of the tumor itself.

The tumor now being enucleated, we will cut through the central portion of the tumor. We find that it is a dense fibrous tissue characteristic of the type of growth known as intra- or pericanalicular adenofibroma.

You will observe that the gross appearance of this tumor is very similar to that of the gross appearance of the fibroid of the uterus. You will also observe that there is a definite capsule. I am satisfied that the report by the pathologist on this tumor will be innocent, and we shall proceed to close up the opening in the breast without further mutilation of the breast.[1]

[1] Subsequent pathologic report proved this to be an intracanalicular adenofibroma.

FIBROID OF THE UTERUS

THE patient is a woman forty-one years of age who has observed a large tumor in the right lower abdomen This observation has extended over a period of two years. Her first appearance in my office was in April, 1923, at which time she said she had had a paralysis beginning six years before on her right side, and since which time, that is, six years ago, she has had more or less pain in the right side of the abdomen. I am satisfied that she was never paralyzed, but merely gave expression to this word, owing to the fact that more than likely she felt some numbness in her right lower extremity. At the time that this growth was first observed a Wassermann was done, which was proved negative, but for some unknown reason her physician insisted on giving her a treatment of salvarsan.

Pain began in the lower abdomen, particularly over the bladder; in addition to nocturia had frequency in the day time. As before stated, her first call on me was in April, 1923. The next was July, one year later. During this latter period she was not feeling as well as usual and the growth had made a marked increase in size. At present the growth is the size of a large grape-fruit. I saw her again on October 21st of this year, three days ago, when she came in and desired to be operated upon. The diagnosis made at each visit in my office has been that of fibroid tumor with bilateral laceration of the cervix.

While the patient is being prepared, and observing that some of the audience are inspecting our sterilizing of the hands, etc., I would say that in the past fifteen years in this clinic we have abolished everything in the preparation of hands except green soap and the brush. We use the soap copiously and the brush very heavily for from three to five minutes After the hands have been scrubbed, they are dried with a sterile towel and dusted with sterile talcum powder before the gloves are put on.

The patient now being ready, we shall proceed with her case. All of our patients for abdominal sections that come in the night before are prepared by giving them a very mild cathartic

at bed hour and an enema in the morning, providing the evacuations have not been sufficient. In the event of an afternoon operation the patients are allowed a light breakfast, consisting of fruit, cereal, coffee, and an egg, or eggs, and water or soups and broths until one o'clock, if it is an operation after 2 P. M. If it is a late evening operation, four or five o'clock, fluids are allowed until two hours before the operation. No abdominal preparation whatever is made the night before, except dry shaving, and this very frequently we do not do until the hour of the operation. It is conceded in this statement, of course, that we are dealing with patients who do have an occasional bath.

Upon the patients being placed upon the operating table preparatory to making the field sterile with sheets and towels, we paint the skin surface well beyond the field of operative involvement with a 50 per cent. U. S. tincture of iodin. In placing on our protective sheets and towels, for quite a number of years we have been exceedingly sparing with these materials, feeling satisfied that a good quality of sheet with an operative opening in it and one or two towels are amply sufficient. This I have proved time and time again in twenty-three years' service, in emergency service in Gouvernor's Hospital and fifteen years in this hospital. We are accustomed to placing one or two wet towels on the body of the patient to prevent the instruments from slipping, towels placed upon the patient for the convenience of the operator, etc.

I have always been an advocate of an incision through which you can see and through which you can deal completely with the pathology that one is likely to come in contact with in the abdomen. There is no reason for making a small incision except the old argument that the smaller the incision, the less the size of the postoperative hernia. This argument should not hold good, as none of us strive to get a hernia, but to prevent one, and a suturing of a large incision should be just as carefully done as the suturing of a small one.

It is my intention here to do a complete hysterectomy on account of the cervical lacerations, preferring in all patients

with a lacerated cervix to remove the cervix entirely, for two reasons: One, the prevention of secondary carcinoma, which occurs in 2 to 4 per cent. of retained cervices, and the other, the great percentage of after-foul leukorrheal discharge when one of these types of cervix is left.

It is my custom in doing hysterectomies for fibroids to do the operation from the right side downward with two to three clamps, splitting the cervix transversely as low as possible, and then going from below upward on the opposite side, saving the adnexa that are healthy in all patients under fifty years of age, unless the menopause is well established.

After the uterus has been removed I then remove the cervix by splitting the vagina below the cervix in a transverse manner, clamping the cervix and rotating it on its transverse axis, making the removal with a great deal of facility, owing to the absence of the body of the womb.

My next step is to close the opening in the vagina by a suture, ordinary or interlocking, involving only the mucosa and the muscular structures. It is astounding with what facility this can be done and how the oozing hemorrhage will immediately cease, giving one a clear field in which to work. The next step is to ligate the uterine by stitching about it on the most feasible or accessible side and continuing with this suture ligature throughout the broad ligament on that side, and finally tying the broad ligament and this portion so that a transfixation can be done with the needle into the vault of the vagina previously made. The other side is then attacked in the same manner.

Having finished the hysterectomy, we shall now proceed to investigate the abdomen for other pathology. We observe that there is a long and densely adherent appendix with foreign bodies. This I shall remove and do remove in all instances, taking care in my technic, so that there is no spillage at all where the appendix is removed and the stump inverted. I am still in the habit of inverting the stump of the appendix after it has been clamped and tied and smeared with carbolic acid. While I am aware that it is not essential to take all this pre-

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black silk. This gives a most beautiful finish to the wounds and due to its pliability there are no rough spots noticed. The silk does not swell, as the catgut will, there are no puncture hole irritations, etc. Its only objectionable feature is that it must be removed. That is done within seven to ten days of the time of the operation.

Our dressings in all wounds consist of four-fold layers of gauze just sufficient to cover the wound, and then the use of adhesive plaster firmly applied, all of which is allowed to remain until the sutures are removed, or until such indication by temperature arises as to demand wound inspection.

In reply to the question which someone has asked as to the use of radium and x-ray in surgical operations, being a surgeon or so rated, I am afraid I would say everything for surgery and nothing for either of these agents. Nevertheless, Clark, of Philadelphia, and others elsewhere agree that a uterus that presents a size equal to that of a three and a half or four months' pregnant uterus should be removed surgically. Also that uterus which is associated with multiple fibroids, that uterus which is associated with diseased adnexa, or that uterus in the wife or sister of the laboring man where efficiency in a short time is essential, should be removed by surgery, bearing in mind all the time that the mortality in hysterectomies for fibroids today in the hands of the general clinical operator should be less than $\frac{1}{2}$ of 1 per cent., and bearing in mind that radium and x-ray may be used mistakenly in a uterus in which there is a malignancy of the body, where an operation would be followed by a very large percentage of non-recurrence.

It has been my unfortunate experience in one year's time to have seen one woman who had been treated for almost nine months, receiving eighteen radium and three x-ray treatments, who had a blood hemoglobin of 25 per cent., a foul-smelling discharge, I found out, of over four months' duration, and a temperature varying from $99\frac{1}{2}°$ to $103°$ F., whom I operated upon after a double transfusion of over 1000 c.c. each time, removing a uterus of the small round-cell sarcomatous variety. A second case in this same period of time was a woman with a

uterus the size of a seven months' pregnancy, with x-ray and radium burns, and a distinct depreciation in her red blood-count, made evidently by the use of x-ray and radium, who expired A third, a physician's wife, who was burned to such a degree on the abdominal wall by the use of x-ray in the hands of an expert as to produce a slough 6 by 8 inches in area and to produce a mental condition which for quite some time bordered upon insanity and a desire to commit suicide. A fourth in which there was a sloughing fibroid following the use, or use and abuse, of these agents, with recovery finally by surgery; and a fifth with a marked amount of vaginal and bladder irritation and no apparent result in the fibroid I will admit, and very gladly, the other side of the radium and x-ray picture, and agree that many cases of small-sized, individual tumors are cured. I am strongly in favor of these agents in carcinoma of the cervix, but as our presentation this afternoon has nothing to do with this question I will not enter into details.

GALL-BLADDER CHOLECYSTITIS (STRAWBERRY VARIETY)

This patient, a female forty-five years of age, was brought to the clinic from the outside with the statement that she was a case of gall-bladder and a possible duodenal ulcer. Unfortunately, during an occasion of this type, when the Congress is on, we have not the time, owing to a paucity of beds in the hospital, to give the patients the proper time observation. With this apology for not having a series of x-rays to bring before you, I am going to give you the history of the patient, such as she presented in my office a few days ago. She complains of pain in the upper abdomen for quite some time. Her family history is negative. She had an appendectomy fourteen years ago.

Present Illness.—Attacks of pain, cramp-like in the lower abdomen, constantly constipated, with the pain at times a gnawing one and at all times irregular in the upper part of the abdomen, exaggerated after eating. She has had no vomiting. The pains have not been relieved by eating. She does not know whether she has lost weight or not. x-Rays were taken, but, as has been said, the reports have not been received.

The fact of no diminution or relief of her pain after eating would contraindicate ulcer presence. On the question of loss of weight, it has been an observation on my part for years that people with gall-bladder disease, not involving of necessity the common duct or the pancreas from the standpoint of palpation and visualization, have a greater loss of weight in a specific period of time with no apparent visual evidences, such as expressed in cancer, than do the malignant cases, and so when a patient with an apparently healthy or normal facies tells me that she has lost 20 to 40 pounds in weight in six months or a year and has been distressed after eating, I am inclined to pay very close attention to the gall-bladder as the source.

Upon opening the abdomen I find that there are marked evidences of dense adhesions throughout. The duodenum is

well dilated. The veins are varicose and very large. The first
portion of the duodenum is attached densely to the gall-bladder.
There are massive adhesions to the stomach. With this ex-
posure, I am satisfied that nothing but a cholecystectomy will
be curative in any way, manner, or form I cannot displace
the liver, due to the adhesions between the liver and the diaph-
ragm, a marked earlier perihepatitis being in evidence. I
note that these adhesions to the liver and the diaphragm are
dense and white. I do not intend to dissociate the liver from
its attachment to the diaphragm, as there is no occasion for it.
In fact, if we do disattach it there will be further adhesions
formed without question In doing a cholecystectomy it is
essential, and the chief object of all of us is, to avoid injury to
the common duct In doing a cholecystectomy it is customary
for me to grasp the gall-bladder near the fundus and also with
another forceps to grasp it near the beginning of the cystic duct,
then to split the peritoneum on the right side of the gall-bladder,
within $\frac{1}{2}$ to 1 inch of its sulcus in the liver all the way down
from the fundus to the cystic duct. This allows the gall-bladder
to be rotated to the left, or, in other words, on its own axis,
exposing its bed in the liver and very easily in the majority of
instances exposing the beginning of the cystic duct. After the
cystic duct has been exposed a clamp is put upon it below and
above and an incision made between the two Then, using the
distal clamp of these two as a tractor and a piece of gauze, the
gall-bladder is pulled upward from its proximal end toward its
distal end thereby exposing the various vessels in the cellular
tissue of its bed These vessels are clamped and cut from below
upward, making a very easy, rapid, and safe cholecystectomy
The gall-bladder now being removed, we ligate the vessels,
beginning below with our cystic duct and cystic artery, using
individual clamps or en masse, I don't care which. The balance
of the vessels are tied from below upward, and unless there is
great oozing from the sulcus of the gall-bladder I do not sew the
edges together. Neither do I drain these cases except in spillage
of infected patients and in acute cases where there is marked
infiltration. For over twenty years I have followed this process

in the non-infected and mildly infected variety. For a good many years I followed it regularly. Then I had a reaction due to the fact that we had a leakage into the peritoneal cavity. I drained for a short time until I regained my courage. Then I ceased drainage, I had a second reaction due to the same type of experience, and ceased drainage again until I had regained courage. My third reaction was again followed in a short time by non-drainage. My fourth reaction was in a patient in whom I opened up about 1½ inches of the abdominal wound so as to allow a proper drainage of bile, who became involved with pneumonia and died. It has now been over three years since this occasion that I have been doing without drains again.

In regard to the question of leakage of bile into the abdominal cavity, it is astounding what the peritoneal cavity will stand in the way of bile without showing any evidences of irritation unless the spillage is distinctly infected, as is seen in cases of acute gangrenous cholecystitis, etc. There is no danger of peritonitis worthy of the argument. Recently I have removed in a period of five days 15 pints of bile from an abdomen of a physician's wife The first 10 pints I removed on the fifteenth day after operation by a surgeon of one of our neighboring towns, and 5 pints by actual measure were removed by me on the twentieth day after operation, to say nothing of the amount of spillage in the dressings and on the floor. This patient made an absolutely successful recovery.

CANCER OF THE BREAST

FEMALE, sixty years of age, tumor of the right breast, beginning to break down Says she has always been a nervous wreck and has had about 20 operations in various parts of her anatomy. Twenty years ago she began to have pain in her right breast. The pain ceased until about six months ago. Four months ago she observed that the breast became large and red. Her history has been elicited with some difficulty as there seems to be a distinct mental obscuration. This patient was examined in other clinics outside by several different physicians, one examination being conducted with a view of finding out whether or not she was contaminated with syphilis. It was stated she was, although her Wassermann was negative. Notwithstanding this negative Wassermann, she was placed on the usual antisyphilitic treatment.

I am going to remove the breast in this patient in order to give her a chance to heal up by excising the breast with its foul discharging ulcer, which is also the source of a great deal of pain, and I am doing the excision here because the axillary adenopathy although palpable is not marked and the breast is not adherent to the deeper structure. I do not expect in this case to produce a cure, but will positively have a relief. In this instance the adenopathy may be detected owing to the fact that the woman is very thin. I never feel for adenopathy in the hope of finding it present as a diagnostic factor, but use the finding of its presence as a prognostic factor and feel satisfied that in many, many of our patients we cannot palpate the adenopathy that is present owing to the fat that covers the glands. In other words, the non-palpability of adenopathy does not mean the patient has not a malignancy. If one waits for adenopathy to be palpable or found, the malignancy has advanced to a point where the operation is merely of relief and not likely to be followed by a large percentage of cure.

Out of over 500 cases operated on by me in the past eighteen years for tumors of all kinds, 386 were malignant, and extensive resections and amputations have been done in all of these malignant cases during the period of eighteen years. For three years and over we have not been advocating in my office the use of radium and x-ray therapy postoperative as much as we did formerly. We do not do it at all at present except the patient, her physicians, or her friends ask for it. I have observed in the office that the number of skin recurrences and chest complications is far greater than it was before the use of the high current. There are more patients who have returned to my office since the use of this current and the use of radium with multiple spots all over the chest and with apparent granulomata than in our experience before the use of the 250,000 and 300,000 volt current. I have had the same secretary, a lay woman, not a nurse, for seven years. Three years ago she said to me, "Why do you insist on sending these people out for x-ray high-power treatment? We have more of them coming back than ever before and more than at any time in the beginning of my service with you." This woman was a most intelligent observer and made a frank statement to me about a thing to which I had been giving a great deal of thought for over a year, but did not dare to take the public stand I am now taking.

One of our prominent x-ray men in this city in a conversation with me a year ago stated that the conclusion of six prominent x-ray men in regard to adenopathy was about as follows: That when the adenopathy was well marked into the apex of the axilla that patient should not be operated upon surgically, but should be given x-ray, conveying the impression that he felt that when the adenopathy was high in the axilla it was already present in an advanced degree in the mediastinum, and that if the patient had not a marked adenopathy palpable and well up into the axilla, she should be operated upon surgically and should not be given x-ray.

Do not leave this amphitheater thinking that I am knocking x-ray and radium. I am giving my individual viewpoint of a series of cases over a period of eighteen years, together with my

knowledge of recurring metastases from a clinical standpoint, and I know that in the past five years recurrences have been greater and earlier than ever before in my experience. I am not satisfied of the efficacy of preoperative x-ray or radium treatment. Having had several of these patients very closely watched and very carefully attended to by men of absolute experience, in whom after the removal of the breast the tumor was proved by pathologists not to have been affected in any way, manner, or form in its cell formation; in other words, that the preoperative use of x-ray and radium did not produce a sickening or a death in the cells, whatever that may mean. I have had a patient with a marked orange peel skin breast very much improved as far as the infiltration was concerned who received numbers of large doses through a period of eleven months, with a definite disappearance in size of the adenopathy, a definite disappearance in the skin involvement, and a loosening up of the tumor, but upon operation it was found that there were no evidences whatever of destruction in the cell activity or the cell formations.

It is customary for me to make one of two types of incision, either the modified Willy Meyer-Halsted, in which I make a gently sloping incision convex over the deltoid, or the Stewart incision, after the method of the late Stewart, of Philadelphia, with greater attachment for the former incision. In this instance we will make the Willy Meyer-Halsted modified. I begin my incision on the arm at a point near the insertion of the pectoralis major, sloping gently over the deltoid with the convexity upward, coming down over the chest either inside or outside the breast, giving ample lee-way to obviate coming too close to the growth, surrounding the breast by an additional incision, exposing the pectoralis major, excising it and the pectoralis minor, but not always the minor, making the incision sufficiently long on the abdominal wall to allow the removal of the chest portion of the rectus sheath after the method of Handley, but do not do it in all instances; dissecting out the axilla freely, en masse or block excision—closing with drain. The patient's arm is tied to the side for twenty-four or forty-eight hours. The drainage

is removed in about forty-eight hours, and except in the event
of temperature, the arm is allowed free from the side   Passive
and active motion is undertaken the second day, patient is out
of bed, or should be, at the end of twenty-four hours   In the
event of no infection, the stitches are removed at the end of the
seventh or eighth day   The patient is allowed to go home be-
tween the seventh and tenth day if desired on her part, other-
wise she is kept in the hospital about two weeks from date of
operation

During the excision of the breast you will observe that no
pressure is allowed on the portion that is to be excised   Every-
thing is done with traction forceps and with remote points of
dissection before the mass containing the growth is handled in
any way, manner, or form   In the series of breast cases reported
in the beginning of this operation I am fortunate to be able to
report but two deaths   These were both the results of epi-
demics, if I may use the term, of Streptococcus hemolyticus
infections in the hospital   My longest case on record that I
can trace today is sixteen years without an evidence of recurrence,
who died two months ago from senile dementia, presenting
absolutely no evidence whatever of a suspicion of a malignancy.
My next is eleven years in duration, dying in the eleventh year
from some type of growth, about the size of a tangarine, press-
ing upon the recurrent laryngeal nerve x-Ray showed a dense
shadow above the aorta, not invading the aorta at all   What type
of tumor this was we do not know, as autopsy was not granted,
but we do know there were no evidences anywhere else of en-
largements which were suspicious of metastatic malignancy

INTESTINAL FISTULA

THIS patient is a woman thirty-six years of age with intestinal fistula. She was operated upon nine months ago for an acute abdomen. Upon opening the abdomen a perforation of the ileum was found, together with an ulcer, which was diagnosticated as tuberculosis. In a letter recently from the physician who operated upon her the following statements were made:

"This patient was operated on nine months ago for an acute abdomen. Upon exposure of the contents of the abdomen it was found that the intestines were bathed in a fluid resembling intestinal contents, non-fecal, that there was a hole in the ileum, a perforation which subsequently was proved to be tuberculous."

The opening was surgically reamed out so as to give a healthy aspect to it, the intestine was pulled through the abdominal wall, the wound sewed up and an attempt at a Mikulicz made, with a failure, as you see. Upon examining the patient we found a long scar in the right half of the abdomen. In the middle of the scar at a point about the tip of the cecum or beginning ascending colon a sinus or fistula discharging fluid, greenish in color, resembling bile, but with no fecal contents. Marked excoriation of the skin, and a pachydermatous-like area about 3 by 3 inches surrounding the sinus. The woman is markedly emaciated and presents a picture of very marked loss of resistance.

Operation.—The scar about an inch above the sinus and an inch below the sinus is grasped with towel clamps. I am making a dissection, exposing a section of gut which looks exactly like a pair of trousers with the top open and the legs continuing as the intestines. This was evidently the attempt at the Mikulicz enclosure by means of the enterostomy clamp. I am reaming the top portion or opening of this so as to eliminate all scar tissue,

preventing the possibility of non-union, using the ordinary suture as used in all intestinal work, three rows of suture being placed in, the intestine being dropped into the peritoneal cavity, and the peritoneal cavity being sewed up without drainage [1]

During the past five weeks I operated upon a child thirteen years of age who had been operated on five months before for an acute abdomen, and in this instance the physician in a local town in an adjoining state found a thickened cecum and a perforation in the cecum on its anterior wall, the appendix being normal. Feeling that he might have an intestinal obstruction, owing to the thickening in the neighborhood of the ileocecal valve, he incised the cecum down to and around the perforation and palpated with the finger the ileocecal valve and felt that he had a closure, and therefore did an ileocolonic anastomosis by associating the distal ileum with the beginning of the ascending colon. This was followed by a non-repair and a most horrible sinus or opening, discharging feces, intestinal contents, and everything else for a period of five months, requiring numerous pads per day, yet withal the patient lost very little weight and suffered very little inconvenience, barring the constant soiling of her abdomen. This specimen was examined by the doctor and pronounced tuberculous. When I saw the child she had a large opening over the cecum and two other openings in the cecum, with a large mass of fungoid granulation, but in excellent physical condition. She had bulbous, enlarged finger tips, no cough, temperature 99½° to 100° F. only. We brought her here to New York and operated on her within a couple of days after her arrival, and upon dissecting out the sinus, etc, we found it necessary to excise 12 inches of the ileum, the entire cecum and ascending colon, and one-half the transverse colon, doing a side-to-side anastomosis The specimen being opened, the entire cecum was found studded with ulcers which were pronounced by the pathologist definitely and characteristically tuberculous This patient made a recovery which was astound-

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[1] Patient made a very rapid convalescence, discharged from the hospital, having gained 7 pounds in weight in twelve days The pathologic report disproved any tuberculous evidences in the portions removed

ing in its rapidity, she being allowed to go to her country home in the third week of her period in the hospital.

We have had two experiences in the past year of intestinal fistula which were absolutely unexplainable. One was in a male in whom I did an appendectomy and cholecystectomy. The entire intestinal area was covered by a good, thick pad of omentum, as the patient was quite fat. Upon his eighth day he complained of a leakage on his abdominal wall, and upon taking down his dressing we found intestinal contents. Some of the particles found were the flakes of oranges. The second patient was a well padded with fat woman on whom I did a hysterectomy who also developed an intestinal sinus or fistula within her tenth or twelfth day postoperative. In both of these patients early operation was necessitated, due to the fact that the openings were in the small intestine. Nutrition was being maintained without any difficulty, nevertheless, as always occurs in these instances of small intestinal perforations, the perforations were growing larger by eversion. Prompt repair occurred in each instance, so that the patients were well within two and a half weeks after the closure or resection of the perforation. I have been at an absolute loss to explain the reasons for these two occurrences in my own practice, they being the only ones in abdominal surgery that I have had in thirty years' work. I am satisfied that neither of these cases was due to a suture perforation, as I am exceptionally careful in closing the peritoneum and fascia myself. I am also satisfied that these, as near as I can judge, were not due to small herniations in between fascial gaps which might have occurred as the result of imperfect closure, etc. The question very naturally resolves itself into that explained by Kocher and subsequently written up by Dr. Albert Sellenings of this city, where one has isolated follicular ulcers after strangulated hernias, incarcerated hernias, etc., that these perforations occur, as a rule, in the proximal section and not in the distal. The same subject is touched upon in the Annals of Surgery for the month of October, 1924. This brings me to the subject of perforation of the transverse colon in gastric ulcers. At first when these cases were discovered it was thought that

they were accidents as the results of stitch misplacements, the misplacements involving the colon in their grasp, but we are now satisfied that these perforations of the colon are true perforations following inflammatory conditions with associations between the stomach and the jejunum and the colon, finally producing a rupture or perforation into the large intestine, possibly by abscess formation.

BILATERAL HERNIA

THIS patient is a male twenty-six years of age, machinist by occupation, who complains of left inguinal hernia for four years. He states that the hernia is not growing and that he is wearing a truss with which he is becoming disgusted, owing to the fact of the distress that the truss itself produces

He was operated on his right side six or seven years ago. On examination we observe the scar on the right side, while in the left side we have a hernia of moderate size. You will also notice some pigmentation over the external ring of the left side which is due to the wearing of the truss. This hernia is of the indirect variety and we will proceed in the ordinary Bassini method, calling attention to the bony landmarks in this operation as being the anterior superior spine of the crest of the ileum and the spine and the crest of the pubis. A line drawn between these two points with a slight tendency to a concavity upward will give the course of Poupart's ligament. Midway between these two bony points we have the internal abdominal ring and at the extreme inner point over the crest of the pubis we have the external abdominal ring. Between these two rings is the situation of the inguinal canal through which all indirect hernias pass.

There is no more beautiful anatomic work to be done than in the repair of an inguinal hernia of the indirect variety. The various layers are as distinct as in your text-books of anatomy during your courses as medical students: the skin, the superficial layer of the superficial fascia, the deep layer of the superficial fascia, then the aponeurosis of the external oblique, always recognizable by its oblique fibers pearly gray in character, containing no fat, and glistening.

On splitting this layer, the aponeurosis of the external oblique, so as to involve the apex of the external ring, we expose to view the arched fibers of the internal oblique muscle and the transversalis, these two muscles forming eventually the con-

joined tendon which is inserted into the fascia covering the rectus muscle at its point of insertion The structures found in this canal are the cord, the cremaster muscle, etc.

Descending down upon the cremaster muscle and separating it from the cord proper, we expose the fascia covering the cord, which also contains, in this instance, the sac of the hernia. The sac of the hernia is carefully dissected out from the cord structure, well up into the internal ring, and pulling upon the sac itself one brings down a funicular process of the peritoneum.

After the sac is tied off, the inner sharp border of Poupart's ligament is exposed, and the white structure of the conjoined tendon is sutured to Poupart's ligament beneath the cord. In the uppermost segment of the hernial opening, in view of the absence of the white structure of the conjoined tendon, we take one to two stitches in the muscle-fibers forming the conjoined tendon, and although it is said at the present date that the red fiber does not attach itself or unite with Poupart's ligament, one who has to dissect every now and then recurring hernias can bear witness to the fact that dense scar tissue does occur.

The next step is the sewing of the gap made by the incision of the fascia of the external oblique so that we cover over the cord in a new bed or canal, but in a normal canal as desired and devised by nature.

These patients are kept in bed by me for nine days in the single variety and twelve days in the double, when they are allowed to get up, the stitches having been removed about the ninth day They are sent home on the twelfth to fourteenth day and allowed to do clerical work at the end of the third week. Care and attention is paid in regard to allowing them to do heavy work, restriction usually covering about two months.

DUODENAL ULCER

THE next patient is twenty-eight years of age, suffering with a duodenal ulcer. Male, painter by occupation. He began to have distress in his abdomen four years ago. This distress began one-half to one hour after eating. He had a cessation of symptoms for over two years. Then they began again and now for four or five months the pain has definite colicky symptoms, at eleven in the morning, three to four o'clock in the afternoon, and two in the morning.

There has been no great loss in weight. He has not vomited up to within four days ago. There has been no evidence of blood. x-Rayed four years ago, when a question of ulcer of the stomach or duodenum was diagnosticated.

Note that this patient begins with his difficulty about one-half to one hour after meals. It is customary in duodenal ulcers to begin within a few minutes to four hours. Patients with duodenal ulcers do not complain of pain, but of distress, gas, heartburn, and distention. There is never pain of a sufficient degree to require an anodyne in duodenal ulcers except when perforated, when the pain is intense.

The gap period of perfect health occurs in many of these patients. These are the patients, when treated by the medical man, be it Sippy diet or Sippy treatment, or what not, who are classed as cures, but who would have presented the same cessation without medication and without diet. These patients also have a distinct history of cessation of distress and a feeling of normal health for a period longer than the periods of symptoms. The symptoms, as a rule, vary from ten days to four weeks, while the periods of cessation of symptoms last from two to six months or more. Again, these patients have a seasonal recurrence. Spring and fall are the periods of the year in which they complain the most. Again, the activities with nerve strain, business cares, etc., are likely to be productive of recurrence of

symptoms. Habits, such as smoking, will also be productive or irritants of the condition, producing excess symptomatology.

Rarely do we have a patient with duodenal ulcer record a loss of over 5 or 8 pounds in weight. This is due to the fact that, although the dietary is limited as to quantity, the frequency of intake of food to relieve pain makes up for the diminution of food at a stated time
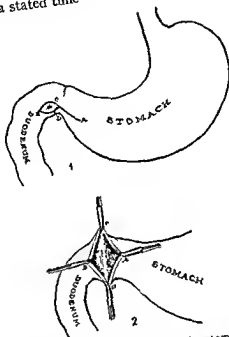

Fig 148—1 Showing line of incision in the stomach and the enclosure and exclusion of the ulcer in the duodenum 2. The method of grasping the opening in the stomach and duodenum so as to sew transversely.

On examination of this patient we find that he has a distinct tender spot in his upper right quadrant On exposure of the contents of the upper right quadrant through a pararectus incision in the right side, we find a profound paracholecystitis, a chronic appendix, one thickened, adherent and angulated, and all the evidences that go to make up the diagnosis of a duodenal ulcer. These evidences are thickening, in this instance in the upper and anterior surface of the duodenum, stippling, which is

definitely diagnostic, and adhesions. In addition, in this instance, we have a distinct stenosis at the beginning of the duodenum. These ulcers, as a rule, are situated in the first ¾ inch of the duodenum and may encroach on the pyloric sphincter, extending with and infiltrating into the pyloric antrum, but not with their ulcer beyond the pyloric sphincter.
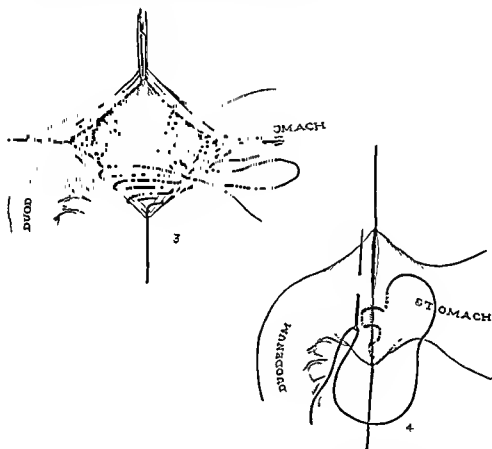

Fig. 149—3 Sutures being placed transversely, primary sutures through mucosa and cirrhosa 4. Superficial closure of the duodenum and stomach transversely by Cushing suture.

Various methods of treating these ulcers are being followed at the present time. Finsterer, on the other side, for several years has been excising the entire pyloric antrum, in other words, the acid-bearing portion of the stomach and that portion of the duodenum containing the ulcer, repairing either by the method of Billroth I or Billroth II, or the Polya, while Horsley, of

Richmond, Va., has been doing a plastic operation of excision, which I shall do today. In some of the larger clinics, such as Rochester, they still adhere to the posterior gastro-enterostomy. Personally, I have not given up the posterior gastro-enterostomy, but for four years have become very much attached to the operation of Horsley and had intended operating upon a series of fifty, but have become so fascinated with it that I have now
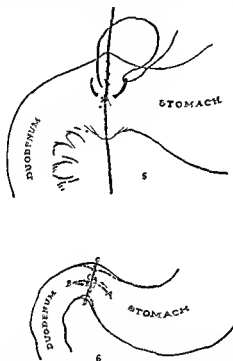

Fig. 150.—5. Extra row of sutures, Lambert, being made. 6. Solid line showing suture toward lines of original incision.

passed my sixtieth operation of the Horsley variety. This operation consists, briefly, in making an incision into the stomach twice as long as the incision into the duodenum, parallel to the long axis of the stomach surrounding the ulcer in the duodenal portion of the incision so as to excise the ulcer itself, then sewing up the gap in a transverse manner so as to widen the pylorus itself.

There is no need of describing the steps in this operation, as the illustrations carry it out so plainly that one can understand it from them (Figs. 148–150).

I am quite satisfied that this operation has its place, but I do not hold a brief either for or against it at the present time. As I have now passed my sixtieth Horsley, I may continue to the one hundredth, unless I find that I am not having the success with it that I anticipate.[1]

I am doing a cholecystectomy and appendectomy in this patient, first of all a cholecystectomy to give us more mobility to the duodenum, also to eliminate the possibility of secondary gall-bladder infection which we have proved in our series so far as being a distinct factor of morbidity after operation. The appendix is removed, owing to the fact that for years we have understood that the appendix is a decided factor in producing ulcer of the duodenum, and also producing disease of the gall-bladder through the lymphatic invasions.

[1] There will be an article in the Annals of Surgery reporting in detail these patients, the paper having been read before the New York Surgical Society in November, 1924

CHRONIC APPENDIX

Male patient, twenty-eight years of age, who has come here for prophylactic removal of his appendix. History is as follows:

Gets pain in his "stomach." Two attacks in the last four weeks, pointing to his epigastrium, four to six hours after meals. No night attacks. No morphin required. Takes an enema, getting relief from his pain at once. No nausea. Has never been laid up. Has never had a definite attack of appendicitis, characterized by pain, nausea, tenderness, etc.

Upon examination he is exquisitely tender in his right lower quadrant and was advised by me to have a prophylactic appendectomy done.

Upon opening the abdomen through a high Kammerer incision, exposing the gall-bladder, pylorus, and duodenum, we find the entire upper segment normal. Pressing the hand down in the iliac fossa and bringing up the cecum, we find that the appendix is thickened, that it has a stricture at its distal third, and that it is adherent, having sufficient pathology to call it a chronic appendix. The appendix is removed, a purse-string suture after ligation of the stump previous to the excision of the appendix. The stump is smeared with pure carbolic acid, 95 per cent., then inverted, and the patient sewed up. He will be allowed to go home, barring recuperative accidents, the eighth to the tenth day.

GENERAL PERITONEAL CARCINOMATOSIS

A BOY nineteen years of age by the name of U. This boy gives a rather interesting history. Five weeks ago while driving his taxicab he stopped suddenly, struck his head on the steering wheel, went home, and in the course of a week felt pain in his abdomen. In trying to orient himself and find some cause for the pain in his abdomen, he thought he might have struck the steering wheel with his abdomen at or about the same time he struck the steering wheel with his head.

In going over the history and findings in the case we are satisfied this was merely a coincidence. When he came to the hospital a week ago his abdomen was distended, presenting the picture of a ten months' pregnancy, or a large accumulation of ascites without the usual signs of ascites. There were cramp colics, very profound, and, even with the immense amount of distention, one could outline severe peristalsis With digital examination by rectum we were unable to outline anything owing to the distention. A diagnosis of intestinal obstruction, cause unknown, was made.

Owing to his intense suffering a hurried cecostomy was done. Upon opening the abdomen and palpating the cecum, the hand was put into the abdomen to explore, and numbers of small nodules were found in the vicinity of the cecum and ascending colon. A Paul tube was introduced into the cecum and fully 2 gallons of liquid feces were withdrawn in the first twelve hours.

The patient's abdomen became boat shaped and in twenty-four hours his condition rapidly improved. Owing to the fact that an opening was made in the cecum no attempt to make a diagnosis by x-ray was considered, but the family were notified that the patient's abdomen would be opened in the center line in the course of five to seven days to explore him properly. We will do that this afternoon.

You will observe the cecostomy wound, the boat-shaped abdomen, and on incision exposing the peritoneum we find that

the peritoneum is rough, resembling to a degree the nutmeg grater. On further exposure you will observe numerous nodules varying in size from a pin-head to that of a filbert, evidently without a question carcinomatous In palpating further for a primary seat of growth, I am unable to state definitely the source of the original lesion The omentum is thoroughly studded with carcinomatous tissue and specimens of the omentum will be removed, in addition to growths from the peritoneal wall, and the wound sewed up

Pathologic report: General carcinomatosis of the peritoneum. Primary growth not known

January 1, 1925: Boy still alive and doing very well It might be stated here that some of these patients with this type of growth have been known to live for quite a period of time.

FEMALE, forty-one years of age, married. This patient presents a most interesting picture in view of the fact that no blood-picture whatever has been obtained from her that is diagnostic in the least sense. All the pathologic and clinical experts, etc., have given up making a diagnosis from her blood or clinical picture. Her symptoms are exceedingly few. She complains of having been nervous, weak, and constipated always, that she
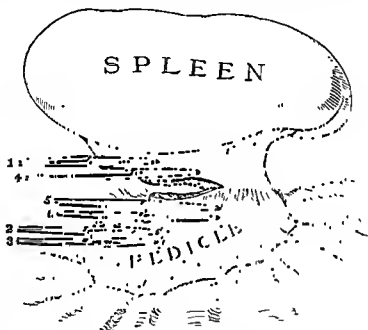

Fig. 151.—Spleen, with clamps being applied to the distal and proximal pedicle.

has had a pain in her back, left thigh, and groin for years. In fact, she says that the entire left side of her body has been painful for a period of years, that her menses have been normal until two years past, when she began to have but one day's duration. This persists at the present time.

On examination, this patient presents no abnormalities until one approaches the abdomen. On palpating the abdomen, there

is a tumor in the left side which reaches from the costal arch down to the groin. This tumor is movable and smooth and can be displaced from the lateral aspect of the abdomen toward the center We feel satisfied that it is a spleen and intend exposing the abdomen with an end in view to do a splenectomy.
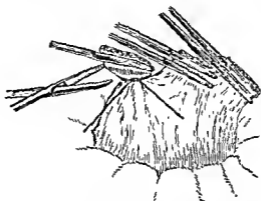

Fig 152 —Clamp on proximal pedicle being removed with ligature applied
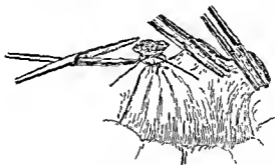

Fig 153.—Clamp being removed from proximal pedicle while distal ligature is applied to proximal pedicle stump.

The clinical picture, and blood-pictures, as stated, present no evidences whatever of diagnostic value.

Various incisions for removal of the spleen are made, a first being in the left rectus from the costal arch down as far as necessary to give proper exposure. An additional T incision may be made or a median incision which many operators use.

We are exceedingly careful of our hemostasis, tying off as we cut the superficial tissue before opening the peritoneal cavity. Upon opening the peritoneal cavity, a large purplish-brown tumor is exposed to view which is without question the spleen. Upon examining its upper pole, where usually the spleen is more or less densely attached, we are fortunate in finding very few adhesions. Promptly breaking up these adhesions, we are able to dislocate the spleen downward. Walling off the intestinal contents of the peritoneal cavity to the right, we dislocate the spleen without difficulty out through the incision, and then proceed to clamp off its pedicle. In clamping off the pedicle,
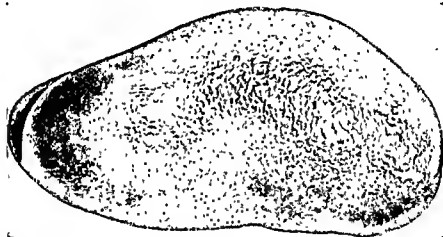

Fig 154 —Spleen.

it is customary with many to make a double clamp on the proximal portion of the pedicle and a single clamp on the distal portion of the pedicle (Fig. 151).

When the pedicle is thoroughly clamped off and cut, we then ligate as follows:

The ligature is placed behind the proximal clamp and tied while the proximal clamp is being removed. The same procedure then is followed with the distal clamp (Figs. 152, 153). This is a safeguard in regard to the slipping of the pedicle and having a very active and at times an uncontrollable hemorrhage.

The spleen (Fig. 154) now being removed and the pedicle

being thoroughly tied off, no oozing being present, the abdomen is closed

This is an unusually large spleen and by measurement is 10 inches long. It might be interesting to give the pathologic report of this spleen and to say that pathologically this spleen has been the cause of a good deal of controversy. Up to the present time (January 1st) it is diagnosticated with a question mark as being in all probability a type of Hodgkin's spleen.

Pathologic Report.—*Gross.*—Spleen measures 270 by 145 by 80 mm. It weighs 1160 grams. The capsule of the spleen is smooth. The color is red. In the hilus of the spleen there are three slightly enlarged nodules and one supernumerary small spleen. On section the lymph-nodes are grayish red and soft. The consistency of the spleen is elastic, not very firm. On *section the pulp is red, the lymph follicles distinct.* No pulp can be scraped off. There are nowhere circumscribed nodules or flecks on cross-section. The trabeculæ are scarce, only near the larger blood-vessels are they readily seen as white streaks.

Microscopic.—The capsule of the spleen is of adequate thickness, 150 to 200 microns, composed of coarse connective-tissue fibers. Trabeculæ of normal thickness, arranged in fairly wide distances, radiate from the capsule into the interior of the spleen. The large vessel branches within the trabeculæ show no changes, they contain blood. The malpighian corpuscles do not show any numerical changes. In almost every visual field there are one to two corpuscles. They vary, however, in size, and the larger ones show regularly a germinal center in which occasional mitotic figures can be found. The reticular cells of the germinal centers contain occasional golden yellow pigment granules. The reticulum of the malpighian bodies does not show any thickening, it is very scanty in the center, slightly denser at the periphery, which is composed of small lymphocytes. At the periphery of the malpighian corpuscles there is occasional golden yellow blood-pigment.

The pulp shows distinct splenic sinuses, which are mostly dilated and filled with numerous cells, among them many red blood-cells. The splenic cords are very cellular and contain
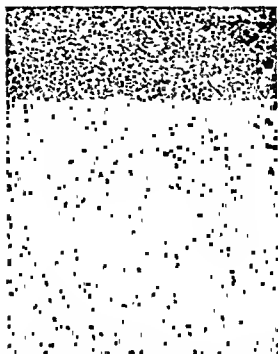
Fig. 155.—Lower power photograph of spleen, showing enlargement of cords through accumulations of large round-cells and giant-cells.
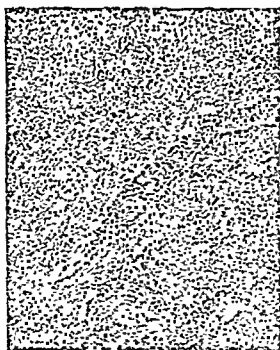

Fig. 156.—The same cells found within a venous blood-vessel.

Fig 157 —High power giant-cells and myeloblasts

Fig. 158.—Group of eosinophil myelocytes within the splenic pulp. Immersion lens.

numerous red blood-cells. Special staining methods reveal the reticulum of the spleen as a rather dense network of finer fibrils, which becomes more compact near the blood-vessels and trabeculæ. The walls of sinuses are lined by distinctly prominent endothelial cells. The sinuses contain numerous mononuclear cells of varying type. Besides polymorphonuclear leukocytes, lymphocytes, and red blood-cells, one sees large cells with round nuclei and eosinophil granulation (eosinophil myelocytes). Furthermore, there are cells of equal size with neutrophilic granulation and slightly larger cells with small nuclei and one or more nucleoli and a narrow zone of cytoplasm These cells do not show granules with Ehrlich's tri-acid stain, but they do show oxydase reaction (myeloblasts). There is a conspicuous number of small cells with very dark nuclei and deep red cytoplasm (nucleated red cells). The most striking elements, however, within the sinuses and larger venous blood-vessels are giant-cells, although numerically they do not compare with the above-mentioned cells. They show multilobulated pole nuclei and abundant cytoplasm. Sporadic neutrophil and eosinophil myelocytes with spongy chromatin threads are found, apparently mitotic figures. The cords of the pulp are composed of the same type of cells as those described within the sinuses. Among these the eosinophil myelocytes and myeloblasts are most predominant. On close examination a few of the last mentioned show fine neutrophil granules.

Besides these cells other large mononucleated cells with pale nuclei and abundant cytoplasm are found which do not give the oxydase reaction. These cells show a very large nucleolus and distinct nuclear membrane and appear identical to the large cells within the germinal centers of the lymph follicles, therefore they can be conceived as reticulum cells. They occasionally show branching cytoplasm; the structure of their nuclei resembles that of the multilobulated giant-cells. Very rarely one sees plasma cells and cells with kidney-shaped or oblong nuclei (macrophages).

Lymph-glands from the hilus show normal cortical follicles with very small germinal centers and medullary cords com-

posed of small lymphocytes The sinuses are very markedly
dilated and densely filled with cellular elements; among these
there are small lymphocytes, occasional polynuclear leukocytes,
numerous eosinophil myelocytes, sporadic neutrophil myelo-
cytes, occasional myeloblasts, and large giant-cells of the type
of megakariocytes Besides these cells which correspond to
those found in the spleen, one sees numerous reticulum and
endothelial cells, which frequently include red blood-cells or
blood-pigment within the lymphatic tissue adjacent to the
lymph sinuses The same cells are frequently encountered be-
tween the small lymphocytes.

The histologic picture of the spleen is characterized by a
proliferation of unripe blood elements which normally occur
only within the bone-marrow. The proliferation produces an
enlargement of the splenic cords. It does not, howevrr, involve
the malpighian corpuscles There is not the slightest prolifera-
tion of fibroblasts. There exists, however, increase of reticular
cells Similarly the enlargement of the lymph-glands in the
hilus is due to an accumulation of unripe blood elements within
the hilus; the lymphatic tissue, however, remains practically
unaltered The differential diagnosis rests betewen lympho-
granulomatosis and myeloid metaplasia The former diagnosis
is suggested by the conspicuous findings of numerous giant cells
of the type of megakariocytes in spleen and lymph-glands The
following considerations, however, speak against lympho-
granuloma

Macroscopically, there are nowhere in the spleen whtish
nodules which produce, in the classical cases of lymphogran-
ulomatosis, the picture of porphyrous spleen Furthermore, the
histologic examination revealed nowhere circumscribed foci of
characteristic granulomatous tissue and the lymphatic tissue of
spleen and lymph-glands is entirely free of primary involvement
throughout. The proliferaton of unripe myeloid elements is
limited to the pulp of the spleen and in the lymph-glands to
the sinuses with occasional local infiltration of the lymphatic
tissue Such pictures are familiar in myelogenous leukemia and
aleukemic myelosis They are, furthermore, found in pathologic

conditions concomitant with **myeloid** metaplasia of the spleen, as, for instance, advanced **pernicious** and secondary anemia, extensive destruction of bone-marrow by tumors, and osteosclerosis. In these conditions exhaustion of the bone-marrow causes the spleen to return to embryonal activity, particularly in the last-mentioned processes (osteosclerosis). Similar conditions in the spleen are reported by authors (Assmann, Ziegler, Beitrage, vol. 41) as found in our case.

Considering the symptom of pain in the left lower extremity one is inclined to think that similar conditions could prevail in our case. The changes in the blood-picture which were found at the last examination indicate an affection of the bone-marrow. An x-ray examination of the bones and repeated blood examination would be helpful for further information.

Diagnosis: Myeloid hyperplasia of spleen and lymph-glands in splenic hilus.

NEW YORK POST-GRADUATE MEDICAL SCHOOL
AND HOSPITAL

CLINIC OF DR. CHARLES GORDON HEYD

HYPERTHYROIDISM; GRAVES' DISEASE SYNDROME;
RESECTION OF THYROID GLAND

The Clinical Classification of Secretory Disturbances of
the Thyroid Gland. The Hyperthyroidism of Adolescence,
of Graves' Disease, and of Adenoma of the Thyroid Gland,
with Their Differential Diagnosis. The Chronic Cardiop-
athies of Thyroidal Origin, with a Discussion of the Surgical
Treatment of Goiter.

History.—The patient I am presenting this morning is a
woman thirty-four years of age, married, born in Sweden, and
has resided in New York City for the past eighteen years. She
entered the New York Post-Graduate Hospital complaining of
(a) nervousness, (b) enlargement of the neck, and (c) loss of weight.
The family history is unimportant—the patient's father and
mother living to the age of seventy-eight and eighty-one years,
respectively. The patient's past personal history is interesting
in suggesting the possibility of previous endocrine disturbance.
She has had two children with difficult labor at each confinement
and one miscarriage at three months between her labors. She
began to menstruate at the age of fourteen, regular every
twenty-eight days, the flow lasting three to four days, with
slight disturbance. At the age of seventeen, previous to her
marriage and three years after the beginning of her menstrual
history, the patient had an amenorrhea lasting one year. This
interlude free from menstruation was without any known cause
and without any symptoms. The present illness began three

months ago with the rather rapid development of "nervousness"
Simultaneously the patient began to lose weight and has lost
over 40 pounds since the onset of her present illness About
five weeks ago she began to notice that her neck in the region
of the thyroid gland was beginning to enlarge This "goiter"
has become progressively larger from that time until her ad-
mission to the hospital About a month ago she was told that
her eyes were "getting large," but did not notice them herself
The patient states that she perspires very freely and easily and
that her extremities are always moist At times she has com-
plained of palpitation of the heart, but this has not given her
much distress There has been no diarrhea nor gastro-intestinal
disturbances at any time For the last two weeks has noticed
that her ankles were "swollen"

Physical examination reveals a white woman, fairly well
nourished, but presenting some evidence of loss of weight
She has a fixed, staring gaze, is perspiring moderately, and does
not appear acutely ill The eyes appear a little prominent, with
fixidity of gaze and some widening of the palpebral fissure
There is a suggestion of lateral nystagmus, lagging of upper lid,
and inability to hold interval convergence The pupils are
circular, regular, and react normally The throat reveals a mod-
erate degree of pharyngitis, with inflamed tonsils The thyroid
gland is moderately enlarged, symmetric and firm, with some
evidence of increased activity with a thrill and bruit There is
a fine tremor of hands, tongue, and eyelids The apex-beat is in
the fifth interspace—13 cm The right border is not enlarged.
A systolic murmur is heard at the apex and over all the orifices
The heart action is regular and rapid—pulse 112. The lungs and
abdomen are clinically negative There is a slight edema over
the anterior surface of both tibia

Upon admission to the hospital the patient was continuously
confined to her bed. Three days later Dr Cameron V. Bailey
reported on her basal metabolism as follows Height 164 cm.
Weight 152 pounds Surface area 1.75 square meters Dura-
tion of test 7 5 minutes Pulse 122. Respiration 26 Ventila-
tion 9.84 liters of air per minute Respiratory quotient 0.73.

Heat value of oxygen 4.714 calories per liter. Oxygen absorbed 356 1 c c. per minute. Total calories per hour 100 8. Calories per square meter of surface per hour 57.58 (average normal 36 5). Result: Basal metabolism 58 per cent. above the average normal Twelve days later a second report on basal metabolism reads: Height 164 cm. Weight 147 pounds. Surface area 1 72 square meters Duration of test 7.75 minutes. Pulse 112. Respiration 38 Ventilation 9 42 liters of air per minute. Respiratory quotient 0.74. Heat value of oxygen 4.739 calories per liter. Oxygen absorbed 352.2 c.c. per minute. Total calories per hour 100 2. Calories per square meter of surface per hour 58.24 (average normal 36.5). Result: Basal metabolism 60 per cent. above the average normal. The urinary and blood examinations were negative.

A critical examination of this woman's history reveals three outstanding and impressive symptoms. As her symptoms were narrated to us her first complaint was nervousness, the second a progressive and simultaneous loss of weight, and the third the development of a visible or palpable enlargement of the thyroid gland. We have analyzed her nervousness and have found that it was associated with a change in her disposition and that she gave the unmistakable signs of continuous and progressive cerebral irritability. Of first importance is the fact that from the moment that the patient began to complain of symptoms until she presented herself to us her condition has represented a rather acute process and the complete evolution of her symptomatology according to her own statement is comprised within a period of three months. It is important to remember that in the clinical manifestation of the hyperthyroidism due to Graves' disease the complete clinical picture is that of an acute manifestation of disturbed thyroid function and usually embraces a period of less than a year. On the other hand, in the hyperthyroidism that is sequential or concomitant with adenoma of the thyroid there is a long period without symptoms of hyperthyroidism when the condition is only manifested by some slight or moderate enlargement of the thyroid gland. After a variable period of time, usually from ten to twelve years after the development of

a goiter, the patient with hyperthyroidism from adenoma begins to show the clinical signs of thyroid oversecretion. In the adenomata with hyperthyroidism there is presented a picture of a more chronic condition, with a long incubatory period, as it were, characterized only by the presence of a goiter and followed by the rather sudden appearance of some of the symptoms of hyperthyroidism.

On physical examination the patient shows the unmistakable signs of hyperthyroidism. We may select four cardinal or cutstanding symptoms as indicative of hyperthyroidism. In the order of importance we will put first tachycardia, or pyknocardia—the most constant and important sign. The pulse rate is almost always over 100 and occasionally goes to 160, or 180, or even to 200. Hyperthyroidism is practically the only morbid condition that allows a patient to be up and about in some fair state of physical stability with a pulse of such rapidity. This thyreotoxic phenomenon is usually present at the beginning and is continuous and persistent. The second cardinal symptom is the presence of a visible or palpable enlargement of the thyroid gland, although it is not imperative that this sign be present for the diagnosis of hyperthyroidism. The thyroid in Graves' disease is always a vascular thyroid. There are present the visible pulsations of the goiter itself, the palpable systolic expansion, the palpable thrill, and finally a variety of bruits that may be heard at almost any point over the thyroid. The third cardinal symptom is the presence of exophthalmos. With the exophthalmos we must consider four other signs that are usually associated with exophthalmos in Graves' disease: (1) The fixidity of the gaze, or the staring appearance of the eyes—the sign of Stellwag; (2) the increase in the palpebral fissure—the Dalrymple sign; (3) the lagging of the upper eyelid on downward rotation of the eyeball—the sign of Von Graefe; and (4) the lack of internal convergence—the sign of Moebius. A fourth cardinal symptom is the presence of a tremor, first noticed by Trousseau and Charcot. This tremor is rapid, fine, vibratory, frequently eight to ten oscillations per second. It is best seen by supporting the wrist and having the patient extend the hand

with the fingers wide-spread. Associated with and adding value to the four cardinal symptoms present in this case is the persistent, continuous, and progressive loss of weight, showing that there has been for some considerable time a period of increased heat production. Conjointly with these symptoms and loss of weight there is to be added the determinations of the basal metabolism of this patient. Three days after her entrance into the hospital she had a basal metabolism of 58. After twelve days of rest and the giving of sedatives and proper hygienic and dietary control the basal metabolism was 60, showing that her thyroid was still in a condition of hyperactivity.

Clinical Diagnosis.—Hyperthyroidism—exophthalmic goiter—Graves' disease, with secondary toxic myocarditis.

Discussion.[1]—Goiter or struma means a visible change in the external appearance of the thyroid gland. Clinically, it represents an easily determined enlargement of the organ. It is usually employed indiscriminately to connote some change in the secretory activity of the gland. Strictly speaking the term "goiter" means very little. It is only by an etiologic relationship to various clinical syndromes from myxedema to hyperthyroidism that it becomes important. Disturbances of thyroid function may be studied from many angles—from the histologic, the pathologic, the clinical, and from the nosologic. From the clinical point of view the essential feature will be the presence or absence of the evidence of hyperthyroidism or the presence or absence of the evidence of hypothyroidism. There are, however, certain types of thyroid dysfunction which cannot readily be placed in such an arbitrary grouping, and it has seemed best for our purpose to have a more extended classification. We realize that there is no clear cut line of demarcation between some of them but for clinical simplicity they may be so separated. It is essentially a clinical classification, and the value of such grouping is that as soon as the diagnosis is arrived at, the treatment of an individual case becomes definitely determined along well-defined lines of therapy (Chart I).

[1] The discussion preceded and followed the operation and is inserted here for reasons of continuity.

CHART I

CLINICAL CLASSIFICATION OF GOITER

A Goiters with hyperthyroidism
   1 Goiter of adolescence
       Physiologic gland with overfunction
   2 Goiter of Graves' disease
       Pathologic gland with overfunction and dysfunction
   3 Goiter of adenoma—adenomatous
       Pathologic gland with overfunction
B Goiters with hypothyroidism or normal thyroxin secretion
   1 Simple, endemic goiter and colloid goiter
       Pathologic gland—secretory activity normal or diminished
   2 Goiter of adenoma
       Pathologic gland—secretory activity normal or diminished
C Neoplastic goiters and goiters with degenerative changes

The histologic unit of the thyroid gland is an acinus lined
with cuboidal or low columnar epithelium resting upon a base-
ment membrane and containing colloid material. In the inter-
stitial tissue of the gland are various groups of cells of embry-
onic origin known as the interstitial cells or embryonic rest of
Cohnheim. In the histologic sense the thyroid unit may depart
in three definite ways: (1) by an hypertrophy of the acinar epi-
thelium, giving a parenchymatous cell type, (2) by an increase
or diminution in colloid material, giving a colloid type, and (3)
by the development and expansion of new alveoli from em-
bryonic tissue, giving an adenomatous cell type. In the pro-
liferation of the acinar cells or in the changes in the amount of
colloid material we have changes occurring in preformed thy-
roid tissue, whereas in the development of new acini from em-
bryonic tissue we have the creation of an entirely new tissue
and one that has not performed in thyroid substance. These
anatomic and physiologic states are paralleled by clinical states
representing a pure hyperthyroidism from hyperplasia of the
acinar cells, a pure hypothyroidism from atrophy of the fibrosis of
the acinar cells, and third, a state of dysthyroidism as the result
of the development of adenomatous tissue. The acinar cells
are the ultimate secreting units for the elaboration of the essen-
tial thyroid secretion—thyroxin. Within the colloid material
iodin is stored awaiting its synthesis into thyroxin, the colloid

material, in brief, being employed only for the storage of iodin compounds. It follows then that the purpose of the thyroid is to elaborate thyroxin and to maintain a continuous discharge of it into the circulation. Thyroxin is ultimately distributed to the individual cells of the body and is the activator of their biotic chemistry and regulates the rate of internal respiration whereby the balance between the anabolic and catabolic processes of cellular activity are maintained. The elaboration of thyroxin is directly due to the cellular activity of the acinar cells in conjunction with the colloid material working upon a basic iodin substance—iodin constituting 40 per cent. of thyroxin.

The more active the epithelial hyperplasia the less colloid material and iodin are stored in the thyroid, as the amount of iodin content varies with the amount of colloid material present. There is less iodin in the gland of hyperthyroidism than in the normal gland, but there is more iodin in the blood as it is more slowly excreted from the system in these cases contrary to its usual rapid elimination. A colloid goiter contains more iodin in the whole gland than the normal thyroid, but, weight for weight, colloid goiter contains less iodin than the normal thyroid, so that although we find the colloid goiter with more iodin than the normal this is due to its enlarged bulk and not that the individual acini contain more iodin.

Histologically the cells of the acini are the secreting agents in each thyroid unit. On the other hand, we have interstitial cells or fetal cells of Cohnheim, which are scattered more or less throughout the gland. It is an accepted fact that the degree of thyroid secretion directly parallels the activity and hyperplasia of the acinar cells. Accordingly, there is direct relationship between the amount and degree of secretion and the amount and degree of hyperplasia. The acinar cells increase in number by three well-defined methods: (1) By individual proliferation, leading to an increased number of cells in the acinus with subsequent loss of colloid material; (2) by infolding or invagination and papillomatous hyperplasia of the acinar cells, and (3) by budding with the formation of independent acini (Fig. 159).

The greater the increase in acinar cells the less colloid material
formed and, conversely, the greater the amount of colloid mate-
rial present in an individual secreting unit of thyroid tissue the
lesser numbers of actually secreting cells If the interstitial
cells proliferate they produce individual discrete tumors, so-
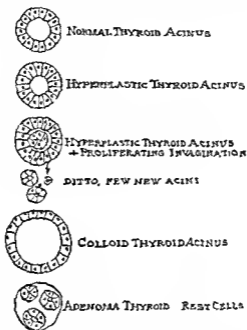called adenomata, which have their own specific secretory

Fig 159 —Schematic representation of the secretory unit of the thyroid
gland Cellular hyperactivity and hyperplasia lead to increased secretion
in Graves disease Increase in the colloid material with lessened activity
or atrophy of the acinar cells leads to hypothyroidism, while new tissue forma-
tion from embryonic rests leads to adenomata with or without hyperthy-
roidism.

activity. By proliferation of the interstitial cells a single or
multiple adenoma may be produced and the degree of forma-
tion of adenomata may bring about atrophy and destruction of
normal thyroid tissue until practically the entire thyroid is
replaced with adenomata, and such thyroid tissue as may be
present will exist along the posterior capsule or at the poles

The thyroid is essentially the regulator of metabolism,

defining metabolism as the sum total of all changes that occur in the human body. This would suppose that the thyroid acts as an independent regulating mechanism. A further consideration shows, however, that among the endocrines there is a quality of function and if one group loses its function it exerts
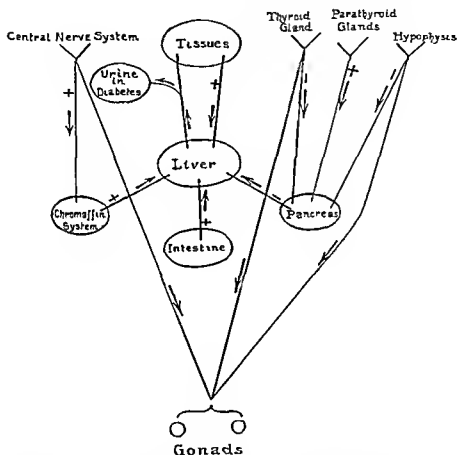

Fig. 160.—A schematic representation of the probable interrelationship of most of the endocrine glands and their proper co-ordination under normal conditions.

an influence upon the others. Hence any disturbance of the thyroid must also take into consideration whether the symptom complex exhibited is a monoglandular affair pertaining only to the thyroid or whether it is a pluriglandular affection in which other symptom groups are introduced representing the disturbance of other glands than the thyroid (Fig. 160). For

example, Murphy in his clinics a number of years ago repeatedly alluded to the fact that an undescended testicle was often accelerated in its descent by the giving of thyroid extract, particularly if given previous to the eighth year. The reaction of the patient with hyperthyroidism when adrenalin is injected is the basis of the Goetsch test and points to the fact that the entire sympathetic system is hypersensitive in the presence of increased thyroid secretion. One is warranted in believing that every tissue in the body is in a state of oversensitization under the
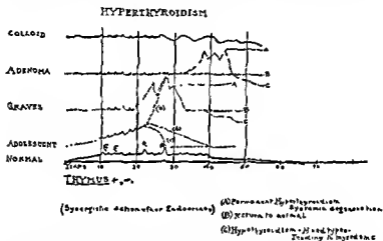

Fig. 161 —The curves of thyroid secretion in hyperthyroidism of adolescence, Graves' disease, and adenoma contrasted with the normal secretion and the hyposecretion in colloid goiter. M. equals menses, P pregnancy, indicating normal functional reaction with temporary increase in thyroid secretion

continuous influence of hyperthyroidism. The presence of glycosuria in hyperthyroidism is not a mere casual observation, but is a very definite and sequential symptom as the result of disturbance in thyroid function.

When we consider hyperthyroidism we should determine whether there is a pathologic or physiologic change in the thyroid gland. An exaggeration of normal function may result from a variety of influences and a hyperfunction might exhibit itself in variations in the quantity of secretion or in its quality. Furthermore, hyperthyroidism might exist as the

result of an increased functional capacity of the gland without intrinsic pathologic change On the other hand, we may have a pathologic gland, but with a thyroid secretion that is normal or in excess or diminished (Fig. 161).

The measuring of the sum total of metabolic changes in the body under so-called basal metabolic test has enabled us to determine accurately the degree of hyperthyroidism at the time the test is made. It is to be remembered, however, that the basal metabolism is higher than normal in youth, in fever, in lymphatic leukemia, and in pernicious anemia, occasionally in cardiac disease, and more rarely in severe cases of diabetes. It is also lower than normal in old age and wasting diseases, and inanition is capable of depressing the basal metabolic rate for a long-continued period of time. There are in addition to the thyroid gland three other glands that are supposed to have an influence on metabolism. Of primary importance is the suprarenal gland and less so the gonads and the pituitary gland. The gonads apparently achieve their influence upon metabolism through their association with the thyroid rather than directly, for the lowered metabolism following castration is apparently due to a depression of thyroid secretion rather than directly to the gonads

In considering the diagnosis of hyperthyroidism we must distinguish the type of thyroid that is responsible for the hypersecretion (Chart II). In the hyperthyroidism of adolescence we find an apparently normal gland exhibiting functional overactivity This particular type of goiter, sometimes called physiologic hypertrophy and hyperplasia or the goiter of puberty, is associated with a mild or slight hypertrophy and hyperplasia of the acinar cells. As a rule, there is a varying degree of hyperplasia of the acinar cells with infolding; rarely papillomatous proliferation. The colloid material may be apparently normal in amount or slightly diminished, depending upon the degree of hyperplasia. If a group of these patients were taken and arranged from left to right in regard to severity of their symptoms we would have at the left hand extremity those nearly akin to the normal and at the right hand end those that

CHART II

PATHOLOGIC CRITERIA

Hyperthyroidism

1. Goiter of adolescence:
     Physiologic gland with hyperactivity.
     Hyperplasia—proliferation of acinar cells   Papillary infolding present.
     Hypertrophy + or —.
     Colloid material diminished.
     Basal metabolism +

2. Goiter of Graves' disease:
     Pathologic gland with hyperactivity or dysfunction
     Hyperplasia +++.
          1. Proliferation of acinar cells
          2. Papillomatous infolding of acinar cells
          3. Development of new acini.
     Hypertrophy ++ or —.
     Colloid material diminished.
     Basal metabolism ++++.

3. Goiter of adenoma with hyperthyroidism
     Pathologic gland with hyperactivity of interstitial cells
     Hyperplasia of interstitial cells in form of embryonic rests—single and
          encapsulated   Multiple or diffuse   Acinar cells not increased.
     Hypertrophy ++
     Colloid material unaffected.
     Basal metabolism ++++.

Normal Secretion or Hypothyroidism:

1. Goiter of adenoma without hyperthyroidism:
     Pathologic gland without hyperactivity of interstitial cells.
     Hyperplasia of interstitial cells in form of embryonic rests—single and
          encapsulated.   Multiple or diffuse   Acinar cells not increased.
     Hypertrophy ++
     Colloid material unaffected.
     Basal metabolism negative.

2. Colloid goiter, simple goiter, endemic goiter
     Pathologic gland with hypo-activity
     No hyperplasia of acinar cells—usually atrophy of acinar cells with dis-
          tention of acini from excess of colloid   No hyperplasia of interstitial
          cells.
     Hypertrophy +++.
     Colloid material ++++.
     Basal metabolism + or —.

Neoplastic Goiter and Goiter with Degenerative Changes:

1 Any form of goiter with the specific cell features of malignancy.
2 Any form of goiter with characteristic types of degeneration

showed marked hyperthyroidism and were potentially a Graves disease. Most of the cases undergo a spontaneous cure, as soon as the physiologic demand for increased thyroid secretion for trophic purposes has ceased.

The consensus of scientific opinion in this country tends to regard this type of goiter as a deficiency disease. Physiologically, iodin is essential to normal thyroid activity and subiodism produces structural as well as functional changes in the thyroid gland and the physiologic action produced by thyroid secretion is always proportional to the thyroxin content. There is a peculiar physical stature to these patients. They are not of robust type, their heredity is usually defective in that they were not born with strong stable organisms. They are thin, emotionally unstable, possessing bad judgment in regard to their diet and personal hygiene. Defective nasopharyngeal apparatus is present in addition to bad teeth and other stigmata of incomplete biologic development.

In the hyperthyroidism of so-called adolescent goiter there is a frequent association of pulmonary tuberculosis. We have had occasion to make a critical study of a number of cases of incipient tuberculosis in undernourished young women and have found that the majority have a slight enlargement of the thyroid with minor degrees of increased basal metabolism. In considering an increased pulse rate in young women with a clinical picture that would ordinarily suggest a mild transitory hyperthyroidism it is well to canvass thoroughly the possibility of a low grade tuberculous intoxication from an incipient phthisis. Another interesting fact is that many of the juvenile patients with slight external protuberance of the thyroid, with some tachycardia, minus or plus values in basal metabolism and with a pulmonary tuberculosis have a hypoplastic vascular system, particularly a small-sized heart.

Simple goiter may be defined as one with an enlarged thyroid and no hyperthyroidism, while Graves' disease is a goiter exhibiting hyperthyroidism with exophthalmos. The immediate cause of simple goiter is lack of iodin. Marine states that thyroid hyperplasia in this group of cases is a compensatory reac-

tion arising in the course of a metabolic disturbance and immediately depending on a relative or absolute deficiency of iodin. If the available supply of iodin is moderately decreased there is compensatory hyperplasia initiated in the thyroid structures, and hence endemic or simple goiter is essentially due to a deficiency of iodin

The thyroid in simple endemic or colloid goiter is usually symmetrically enlarged and smooth, although either lobe may be enlarged over the other or the enlargement may be located in the isthmus. On microscopic examination the acini are swollen, the acini cells are thin, flat, deeply staining, the colloid material and non-absorbable secretions are increased and the whole picture is that of a gland producing a lessened amount of secretion It is necessary to consider the whole gland and not a circumscribed portion. Halsted, by excising portions of the thyroid, induced compensatory hypertrophy in other portions of the gland and occasionally in a section from a simple or endemic goiter new acini may be seen, occasionally infolding and reduplication, rarely papillary production. This goiter occurs pre-eminently in the Alps, and the Himalaya regions The most important areas in our country are the Great Lake Basin, the Cascade Mountain regions of Oregon, Washington, and British Columbia The researches of McCarrison of India have emphasized the importance of gastro-intestinal infection as a goiter-producing factor and states that the conditions which give rise to goiter districts hinge around the supply of iodin and the needs of the thyroid gland for iodin, irrespective of the anaërobic pathogenicity of the intestinal tract.

Two separate and distinct pathologic conditions of the thyroid gland exhibit hyperthyroidism in its most acute form, namely, the goiter of Graves' disease and the adenomatous goiter with hyperthyroidism The isolation in 1914 by Kendall of the active principle of thyroxin from hyperplastic thyroids gave a marked impetus to the study of the physiologic action of thyroxin on the body. In 1915 Plummer formulated certain deductions as to thyroxin. In substance be stated that thyroxin acted directly or indirectly on all cells throughout the body.

It is the agent that accelerates the formation of potential energy and which is available on excitation of the cells and that "hyperthyroidism is the physiologic status of an individual otherwise normal when the thyroxin maintains basal metabolism above the normal." Furthermore, that all the phenomena which usually go with hyperthyroidism are always associated with an elevation of basal metabolism It would seem then that hyperthyroidism represents a dual condition, one in which the etiologic factor is the adenomatous goiter and the other one the goiter of Graves' disease.

It is interesting to note that the taking of thyroid extract or the injection of thyroxin will produce in exact similarity every symptom of the hyperthyroidism of adenoma, whereas it is impossible to produce in similitude the symptoms of hyperthyroidism of Graves' disease either from thyroid feeding or from the injection of thyroxin. This would seem to lead to the conclusion that the hyperthyroidism as exhibited in Graves' disease is in a qualitative manner different from the hypersecretion as evidenced in the adenomatous goiter.

The studies of Plummer on the effect of giving Lugol's solution for the hyperthyroidism of Graves' disease would seem to confirm the impression that the hyperthyroidism of Graves' disease is due to an incomplete or preformed molecule of thyrotoxin, for under the administration of Lugol's solution the clinical picture of hyperthyroidism of Graves' disease changes to the clinical picture that more nearly simulates that found in the hyperthyroidism of adenomata Correspondingly there is a marked drop in the basal metabolic readings within two or three days after the administration of Lugol's solution

In adenoma there is a tumor growing within the thyroid substance. Accordingly, we have a pathologic gland with or without hyperthyroidism. In regard to the hyperthyroidism of adenomatous goiter there are two ideas present, one that the adenomatous cells elaborate and deliver an excess of thyroxin; the second idea is that the adenoma in some peculiar way stimulates the surrounding thyroid tissue to hyperfunction. The evidence would seem to support the idea that it is the adenomat-

ous cells themselves which hyperfunctionate. There can be no doubt that the adenomatous tissue by and of itself can elaborate thyroxin and store up colloid and iodin

The embryonal cells of the adenomatous goiter are stimulated into growth by a variety of unknown factors and for a long period of time the newly created adenomatous tissue cannot properly function It can, however, store colloid and iodin long before it is in a position to elaborate thyroxin. The essential differences in the clinical manifestations of the adenomatous goiter and the exophthalmic goiter are, first, that the adenomatous goiter is first noted as a thyroidal enlargement from ten to twelve years before the development of symptoms of hyperthyroidism, while in Graves' disease the presence of thyroidal enlargement and the occurrence of symptoms of hyperthyroidism are simultaneous or the one follows the other within a very brief period Second, the average duration of symptoms at the time of consultation in Graves' disease is about nine months, whereas in adenoma it is seventeen and a half years Third, exophthalmos occurs within three months after the appearance of hyperthyroidism in an average of 50 per cent. of cases of exophthalmic goiter and within two years in 90 per cent of cases of exophthalmic goiter and is only present in about 3 per cent. of toxic adenomata. Fourth, Graves' disease is a disease ordinarily of the third decade, whereas adenoma with hyperthyroidism manifests its toxic symptoms in the fourth decade. The hyperthyroidism of adenoma is characterized by an insidiousness, by an erratic course over a long period of years, of low intensity; finally, after a period of an average of seventeen years the adenomatous goiter is frankly expressed in conditions of clinical hyperthyroidism.

The characteristic and outstanding feature of hyperthyroidism of Graves' disease is the fact that its complete elaboration takes place within a relatively short space of time and it is the rule that when the case is first seen the clinical picture is usually complete and the outstanding features of the disease are already present The very definiteness of the clinical course in hyperthyroidism due to Graves' disease is one of its consistent and outstanding features.

Else has shown that the basal metabolic rate in relation to the clinical course of hyperthyroidism may he theoretically divided into four stages: (1) The stage of development in which the basal metabolic rate is usually higher than the symptoms would seem to indicate; (2) the stage of increasing intensity in which the basal metabolism parallels the symptomatology; (3) a period of retrogression in which the basal metabolic rate falls to the normal more rapidly than do the symptoms; and finally, (4) the stage of remission in which the basal metabolic rate is somewhere near the normal base line, although the symptoms of hyperthyroidism may persist as the result of chronic degenerative changes in the cardiovascular apparatus, in the sympathetic system, in the autonomic muscular system, etc. In the hyperthyroidism of adenomata surgical procedure is directed to removal of the tumor. In the hyperthyroidism of exophthalmic goiter, however, the procedure is planned to diminish the actual amount of thyroid tissue by the removal of varying amounts of diffuse hypertrophied, hyperplastic tissue. Ligation in exophthalmic goiter is one of the graded procedures to diminish thyroid activity. Removal of the adenoma is sufficient to cure that type of hyperthyroidism whereas, on the other hand, the hyperthyroidism of Graves' disease requires the resection of the greater portion of both lobes and isthmus to reduce the activity of the thyroid within normal limits. Again, there is a group of patients who have suffered continuously for many years from hyperthyroidism. They represent what Crotti calls a "burnt-out thyroid." Landstrom has shown that in all cases in which hyperthyroidism resulted in an actual dilatation of the heart the organ never returned to normal even after thyroidectomy had brought the pulse back to a fairly normal rate. These patients have an irreparable damage to their non-striated muscle fibers, they have the brown degeneration of the cardiac muscles with varying degrees of myocarditis. They have various types and stages of nephritis; their cerebral tissues are physiologically unstable and they are essentially chronic invalids irrespective of what is done for them either medically or surgically. They are incurable, so far as the permanent degenerative lesions that

the hyperthyroidism has produced are concerned. We have seen a number of patients who exhibited hyperthyroidism for ten or fifteen years, and when they came to us their thyroid condition was quite secondary to the degenerative processes that are exhibited in all the higher forms of body tissue.

We have had recourse to basal metabolic determinations as a means of estimating the activity of the thyroid at the time of making the test, and not as a means of diagnosis *per se* nor as an indication for surgical intervention. The former is made by clinical signs and symptoms aided by basal metabolic tests, the latter is always a matter of surgical judgment.

I am going to introduce Dr. Cameron V. Bailey, Professor of Applied Physiology at the New York Post-Graduate Medical School and Hospital.

DR. BAILEY: The ordinary clinical signs by which we recognize dysfunction of the thyroid gland are changes in the structure or function of different parts of the body. These changes may be due to abnormality in thyroid function, as in the myxomatous condition of hypothyroidism, or in the tremulous, flushed, palpitating, and extremely emotional state of the unhappy sufferer from hyperthyroidism. Decreased activity of the gland causes us little concern. When the defect is great the condition is readily recognized by the clinician and as readily rectified by the administration of preparations of thyroid extract. Mild hypothyroidism may go unrecognized and untreated without disastrous results to the patient.

Hyperthyroidism, unfortunately, exhibits itself by profound changes in the heart and nervous system, and *if the intoxication is repeated and prolonged*, by permanent damage to these structures. These symptoms therefore become more or less fixed and *the clinician is thereby unable to estimate the secretory state of activity of the faulty gland at the time of the consultation*. The hyperactive thyroid is not necessarily an enlarged gland nor is it always accompanied by the protruding eyes, the throbbing of the arteries, the flushed skin, the loss of weight, and the gastro-intestinal symptoms so commonly associated with this disorder. The symptoms may be entirely limited to the

nervous system and be confused with many of the hysterical and emotional states familiar to the neurologist. Tuberculosis may be suspected and many patients undergo sanitarium treatment in the belief that this malady is the cause of their nutritional, nervous, or cardiac symptoms. On the other hand, in some patients many of the symptoms of a disturbed nervous system may be due to the absorption of toxins from some chronic focal infection and if by chance the thyroid gland happens to be larger than normal it is immediately suspected as being the offending organ, although functionally it may be quite normal.

Over thirty years ago Müller observed that the subject with Graves' disease consumed an abnormal amount of food without gaining in weight and he decided that combustion must necessarily be increased in this disease. This belief was soon substantiated by determinations of the oxygen absorption. It was found that the rate of oxidation corresponded with changes in the severity of the symptoms. Calorimetry was placed on a clinical basis by the splendid work of Rubner, who forty years ago stated that "the heat value of the metabolism of the resting individual is proportionate to the area of the surface of the body," and of DuBois, who ten years ago formulated a means of accurately measuring the surface area. The basal heat production of normal individuals of almost all ages and sex was soon determined and it is now possible to state whether a subject's basal metabolic rate is normal or not.

In interpreting basal metabolic rate one must remember that slight changes occur in many pathologic conditions and these must be carefully considered before we attribute the result to dysfunction of the thyroid gland. The metabolic rate is increased in fevers, in acute acromegalia, in Paget's disease of the bones; in blood dyscrasias in which there is increased cellular activity as in the leukemias and polycythemias. The rate is also increased in conditions where there is abnormal muscular activity as of the heart in hypertension and in cardiac disease with dyspnea. Muscular tremors in Parkinson's disease add to the heat production. Last and most important is the activity of the suprarenal gland; emotional excitement is accompanied

by an outpouring of the secretion of this gland and an immediate increase in the rate of cellular oxidation This effect is fleeting, passing off within half an hour hut, unfortunately, it may considerably augment the metabolism during the period of the test. To obviate this requires the greatest skill on the part of the examiner Were it not for this, the statement that "any fool can make a basal analysis" would approach the truth.

With these limitations, calorimetry tells us the present state of activity of the thyroid gland It does not make a diagnosis of hyperthyroidism A patient afflicted with hyperthyroidism may be tested during an intermission and the basal metabolic rate would be within the normal limits, despite the persistence of such clinical signs as nervousness, palpitation, tremors, and exophthalmos Conversely, the test may detect active hyperthyroidism in patients showing few of the classical symptoms of the disease. The test does not tell the surgeon when it is safe to operate upon the patient It informs us when it is the least dangerous to operate, and the surgeon must base his operative prognosis upon the clinical condition of the patient and not upon the basal metabolic rate. The debilitated patient whose heart and nervous system have heen damaged by repeated thyro-intoxications is a poor risk, even though the hyperthyroidism has subsided, whereas the strong, undamaged subject may survive operative procedures at a time when the thyroid is very active.

The onset of hyperthyroidism is accompanied by a progressive increase in heat production which may reach over 100 per cent. above the average normal and persist for weeks after the glandular activity has subsided. Therefore, repeated tests are necessary in order to follow the course of the disease, an increasing rate indicates an active state of the gland and naturally precludes operative intervention; a decreasing rate gives a more hopeful outlook for the surgeon The pulse rate is largely dependent upon the rate of metabolism. The carbon dioxid produced by cellular oxidation must be carried by the blood to the lungs and there pass into the alveolar air. Hence, there is a marked correlation between the metabolic rate, the pulse rate, and the rate of ventilation in the lung. Clinically, a decreasing

pulse rate indicates a subsidence of the hyperthyroidism. Few patients with pulse rates below 60 have a basal metabolic rate above the average normal, and few patients with pulse rates below 85 have any considerable increase in their metabolism. Beyond that, by a consideration of the pulse rate alone, one can draw no conclusions as to the activity of the thyroid gland. The course of the disease and the result of treatment are accurately represented by changes in the metabolic rate. Cessation of hyperthyroidism is followed by a return of the metabolism to within the normal limits, irrespective of the persistence or disappearance of clinical symptoms which may be the more or less fixed signs and symptoms of change due to the prolonged intoxication.

In general it may be said that hyperthyroidism may be treated by a variety of measures. Recently we have been impressed with the work that Dr. William H. Meyer, Director of the Department of Radiology, has been doing with hyperthyroidism. He has undertaken a series of cases with hyperthyroidism and treated them by x-ray. This series has been adequately controlled by basal metabolic determinations both before and after treatment. With a very careful check-up system Dr. Meyer has been able to show some splendid cures, with cessation of hyperfunction of the thyroid.

Preoperative Treatment.—In considering the surgical treatment of Graves' disease we must remember that every case of hyperthyroidism requires personal and individual judgment. There are no rules that are applicable to all cases of hyperthyroidism. Too much importance cannot be placed upon the preoperative treatment and all measures that assist in placing the patient in a suitable condition for operation should be employed. Rest in bed in a quiet environment is of the utmost importance. In the very severe cases we have not allowed the patients to leave the bed in order to go to the toilet, but have maintained an absolute bed position. A daily movement of the bowels is attained ordinarily with an enema or occasionally with mild laxatives. A diet of lactofarinaceous articles is prescribed, and extra attention given to the caloric requirements of the indi-

vidual, even to the extent of hyperalimentation Particular care
is taken to avoid purin foods and the diet is noteworthy in its
restriction of proteins. We have found the elixir of luminal
4 to 8 c.c. one hour after each meal and at bedtime very help-
ful in producing a sedative effect. We have had recourse in
some cases to morphin hypodermically, between 8 and 9 o'clock
every evening for a few days previous to operation. An ice-bag
placed, alternate hours, on the heart and thyroid, has been of
great assistance in lessening the activity of both of these organs.
In young patients with a regular pulse, irrespective of its fre-
quency, the cardiac musculature is ordinarily not markedly
damaged and there is very little necessity for cardiac therapy.
With patients that show some pulse irregularity or in which the
myocardium is distinctly injured or weakened, we have under-
taken a preliminary digitalization of the heart During the
course of the preoperative treatment it is essential to see that
the fluid content of the body is maintained and not infrequently
we have employed a continuous proctoclysis of from 1000 to
1500 c.c. per day. The routine solution consists of tap-water,
10 per cent glucose, and 2 per cent. soda bicarbonate We
have not felt that basal metabolic determinations *per se* should
be the criteria for indicating surgery. They are of great assist-
ance, it is true, but we have had many patients with a high basal
metabolic rate that were in good condition for operation, whereas
others with a lessened metabolic rate, but a more permanently
deranged cardiovascular system, represented a much graver
surgical risk. We have used the basal metabolic determinations
as an aid, but place most reliance on our clinical judgment as to
the ability of the patient to withstand a surgical procedure.
We have always felt that the surgery of the thyroid should be
a graded procedure Much can be accomplished by one ligation
of the superior thyroid or by a bilateral ligation There is this
to be said, however, that all ligations must be followed within
about ten weeks by thyroidal resection To wait longer is to
lose most of the beneficial effect that may have been accom-
plished by ligation, for once having done ligation we are under
the necessity of operating within ten to twelve weeks irre-

spective as to the condition of the thyroid secretion at that time. We can roughly divide the cases, in so far as they are suitable for surgery, into three groups: The first group are those patients that are young, with no marked degeneration of cardiac muscle and who are under almost all circumstances safe surgical risks. We have found these cases to stand operation well with very few complications The second group are those patients in which there is a very definite surgical hazard, but who respond readily to treatment and may be brought into surgical safety. These patients are slightly older than the former group and show some manifest cardiovascular disturbance Preoperative treatment, particularly rest, will do much for these cases, and by the use of preliminary ligation operations they may be brought through a resection safely. In the cases that are distinctly of the Graves disease type we have followed the suggestion of Plummer, and from five to seven, or at the most ten days previous to operation, we have administered from 5 to 7 drops of Lugol's solution in water one hour after each meal. It has been demonstrated that under Lugol's solution a basal metabolic rate will drop from 10 to 20 points, and the patient is thereby converted into an appreciably safer surgical risk than before the administration of Lugol's solution. The giving of Lugol's solution over a longer period of time has been associated with a loss of what we have previously gained with an exacerbation of the thyroidism. The third group are those patients who are surgically unsafe under almost all conditions. They represent the cases showing emaciation, cardiac failure, vomiting, acidosis, and delirium. To attempt anything in the way of surgery is hopeless. Under adequate treatment—combating acidosis, replacing fluid volume, rest, digitalization, and transfusion, many of these patients can be brought into a suitable condition for ligation and eventual resection. We cannot hope to obtain an absolute cure in these cases by any means in our surgical armamentarium. At most, all we can do is to place the patient in a position of better functional activity so that, although chronic invalids, the prospect for life and comfort is better after a successful thyroidectomy than without it.

Anesthesia.—Preliminary medication of morphin, gr. $\frac{1}{8}$, one-half hour before operation. Rectal ether-oil anesthesia, method and formula of Gwathmey.

Operation.—There is at the present time no universal technic for resection of the thyroid. The size of the goiter, its physical appearance, and place in the neck or beneath the sternum will modify the technical procedures which the surgeon employs. At the present time our technic consists of a resection of the major portion of both lobes, including the isthmus. In hyper-

Fig. 162.—The skin incision is only slightly concave and extends from the sternomastoid muscles of one side to the sternomastoid muscles on the other side

thyroidism our failures have ordinarily resulted from leaving too much of the gland in situ In Graves' disease a very small amount of the thyroid tissue is sufficient to maintain normal thyroid metabolism. In colloid or simple goiters a larger amount of thyroid tissue must be left on account of the relatively poor quality of the gland.

We will employ the slightly concave incision, extending over the most protuberant part of the goiter and, if possible, nearer the sternum than the thyroid cartilage. The incision extends

from one sternocleidomastoid muscle to the other and divides skin and platysma (Fig. 162). The flaps are dissected upward and downward very freely. The wider these flaps are dissected and retracted, the more certain is our operative exposure and the more secure our surgical procedures. If the goiter is large
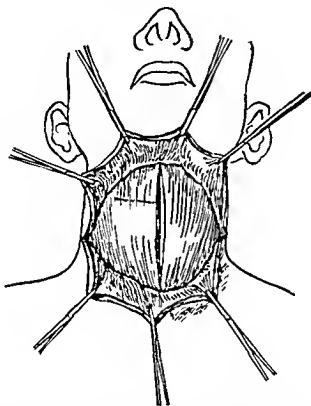

Fig. 163.—The upper and lower skin flaps dissected and retracted, exposing the preglandular muscles The longitudinal division between right and left muscle groups. This incision should be ample and extend from top to bottom of wound. Immediately beneath the retracted muscles is the fibrous tissue capsule of the thyroid. The latter is divided also in a longitudinal direction. Dotted line on left indicates preferable site for division of muscles.

or is suhsternal we have no hesitation in dividing the infrahyoid group of muscles on one or both sides. When these muscles are divided great care is exercised in dividing them at the junction of the upper and middle third. In this manner we avoid injury to their nerve supply which enters the muscle suhstance in their lower third. We have now dissected our flaps well upward and

downward. Our retraction and exposure are adequate. All the
bleeding vessels have been ligated and we are now ready to
proceed with the next step. The preglandular or infrahyoid
group of muscles are divided longitudinally and in the median
line (Fig. 163). This separation of the right and left muscle
groups is extended well up toward the thyroid cartilage and well
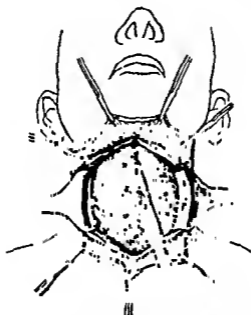down to the suprasternal notch. We now come upon the fibrous

Fig. 164.—The muscles widely retracted to each side. Cross-marks indi-
cate position of clamps. Most of the blood-vessels are clamped before division.
Regurgitant bleeding adequately controlled by traction on gland. The knife
indicates the beginning of the resection—the incision being downward and
outward on an inclined plane. (See Fig. 165.)

capsule of the thyroid. By means of Parker retractors we will
retract each lateral muscle group outward. It is necessary to
include all the preglandular muscles in the retraction. Failure
to do so allows some muscle-fibers to remain attached to the
fibrous capsules and causes troublesome bleeding and inability
to completely mobilize the gland. We see beneath our re-
tracted muscles the fibrous capsule of the thyroid. It is of the

utmost importance to identify this structure. Failure to do so
spells hemorrhage, fixation of the thyroid within the neck, undue
traction, trauma, and difficulty. We divide the fibrous capsule
longitudinally in the median line, exposing the thyroid gland
covered with a peritoneum-like covering beneath which runs a
widely diffused network of blood-vessels. We will begin to
resect the right lobe (Fig. 164) Inserting the first finger of the
right hand beneath the fibrous capsule we gently insinuate it all
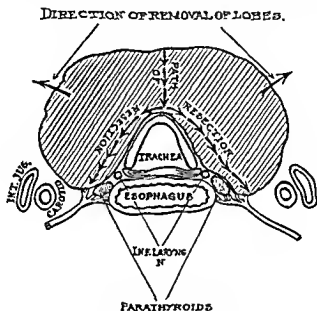around, above and below the thyroid. The fibrous capsule

Fig. 165.—The arrows indicate line of resection through isthmus and laterally
and backward

"slips off" the gland rather readily. It will not be necessary to
divide the preglandular muscles. The isthmus is grasped with
three forceps a little external to the median line and equidistant
from one another, and using these as tractors the right lobe is
pulled toward the external surface of the neck. With knife dis-
section the isthmus is divided. As we approach blood-vessels
these are grasped in the substance of the gland. The dissection
is carried outward and backward, leaving a small amount of
thyroid tissue overlying the trachea. It is essential to leave a
thin film of gland tissue overlying the trachea in order to avoid

superficial injury to the trachea (Fig. 165). Complete denudation of the trachea of all thyroid tissue results in nerve injury to the small nerve-fibers in the external wall of the trachea which will be interpreted by the brain as a foreign body in the trachea with cough and mucorrhea. As the knife dissection is carried backward and outward the free portion of the right lobe is lifted out of its place, and by continuous traction more and more of the deeper portions of the gland are brought into the field, and the resection is carried out whereby the anterior two-thirds or four-fifths of the lobe is removed. Previous to each knife cut hemostats are applied to both the central and lateral segments. We have now divided the remaining portion of the right lobe. We have left behind a residue of thyroid tissue extending from

Fig. 166.—The effect of following the plane of resection indicated. The *posterior capsule* with thyroid tissue, the parathyroids with their nutrient arteries, and the recurrent laryngeal nerves are intact and left *in situ* (After Crile.)

the median line over the trachea backward to the posterior capsule and from the superior to the inferior pole. The trachea is intact. The posterior capsule is still undisturbed and therefore the structure behind the posterior capsule—parathyroids, nutrient arteries to the parathyroids, and the recurrent laryngeal nerve—have never been exposed and are uninjured or even disturbed (Fig. 166). As a matter of fact, the recurrent laryngeal nerve is seldom injured by direct clamping or section, but undue traction on the thyroid gland will occasionally stretch or tear the nerve, with resulting loss of function. Too extensive a dissection in the neighborhood of the posterior capsule may involve the nerve in subsequent scar inclusion, with the same appalling result.

We will now proceed to ligate all the clamped vessels. The vessels near both poles we will ligate by suture-ligature, the remaining vessels may be ligated without transfixion. The vessels are all ligated. We will place a warm moist compress in the wound and proceed to apply the same technic to the remaining portion of the isthmus and left lobe. We have now completed the identical resection on the left side. There is left a complete encircling film of thyroid tissue over the trachea which passes insensibly to the residue of thyroid tissue on each side overlying the posterior capsule. It is absolutely essential that hemostasis be obtained here and now. There has been no disturbance of breathing throughout the operation. Most respiratory troubles during thyroidectomy are due to undue traction on the thyroid or too strenuous dissection. The essential portion of our operation is finished. If the patient were in poor condition we would pack our wound and leave the flaps and skin wide open. By this means we would prevent postoperative wound absorption. Later on today we would remove the gauze and close the wound. Healing is but very slightly delayed if at all by this procedure and it will many times just carry the patient over the dangerous period immediately after operation. The condition of this patient, however, is reasonably good and we will proceed to close the wound. You will observe that there is a certain amount of dead space which has resulted from the removal of both lobes of the thyroid. This incised surface of the gland, together with the periglandular tissues, will continue to secrete wound serum. Wound serum under ordinary circumstances is associated with fever and acceleration of pulse rate. This reaction is particularly enhanced when the secretion is from a hyperplastic goiter and occurring in an already oversensitized individual. We shall introduce therefore a small piece of sterile gauze into each side of the thyroid space in order to drain this aseptic wound secretion to the outside. We will now suture our preglandular muscles together in the median line and then proceed to the closure of the skin incision. The drain will be removed in twenty-four hours and will not interfere with primary healing. A dry sterile dressing is now applied.

The postoperative treatment of this patient will be practically the same as I have outlined for the preoperative treatment We will ordinarily expect a moderate degree of reaction in the form of a postoperative thyroidism. There are, however, two complications which are particularly serious if they arise; one is a marked degree of postoperative hyperthyroidism, with temperature of 104° to 105° F., with marked acceleration of pulse over the preoperative rate, beginning vasomotor failure and dissolution This is best prevented by adequate preoperative treatment and gentle and careful technic at the time of operation Another complication of serious magnitude is cardiac failure occurring immediately or shortly after operation with an irregular, feeble pulse, fall in blood-pressure, dilated heart, and dissolution from heart failure

Hemorrhage is a comparatively rare complication and in the last two years I do not believe we have had in the entire hospital a serious postoperative thyroid hemorrhage The time and place to stop hemorrhage is at the operation

We will give this patient morphin to allay pain and to produce quietness. Restlessness is as bad as pain An ice-bag will be placed for alternate hours over the thyroid region and over the heart. We will give continuous Murphy drip by rectum and fluids by mouth The greater the fluid intake for the first twenty-four to thirty-six hours—the heart and kidneys being equal to it—the greater the dilution of the postoperative thyroidism and the greater the prospects of avoiding a fatal issue.

Epicrisis.—Dr Paul Klemperer, the pathologist, reports that sections from different areas of the goiter show large and small follicles which are filled with colloid. Between the large follicles there are also round follicles which also contain colloid. The follicles are lined by columnar epithelium which becomes flattened in the colloid-containing follicles. There are, however, follicles which do not contain colloid and in which the cylindrical epithelium is very conspicuous. Numerous follicles show folds and in the colloid-containing follicles tabs can be seen projecting into the lumen The stroma is rich in blood-vessels and there are areas of hemorrhage. There are a few groups of lymph follicles

and a few areas show diffuse lymphocytic infiltration. One section shows old blood-pigment and an area of fibrosis.

Pathologic Diagnosis.—Hyperplastic thyroid in a resting phase.

Postoperative Course.—The patient had a moderate degree of postoperative thyroidism with some cardiac decompensation. Her convalescence was somewhat prolonged and disturbing. However, the patient was discharged from the hospital on April 6, 1924, twenty-four days after operation. Her subsequent recovery has been rapid and uninterrupted.

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LENOX HILL HOSPITAL

Clinic of Dr. Willy Meyer

This afternoon we are going to have a clinic which has in part been announced at the express wish of the Local Committee of Arrangements. They desire to have us hold dry clinics at our hospital, present groups of cases we have been interested in for some time, and give as condensed a picture of the results of our experience as is possible in the time allotted.

I have selected a number of subjects which have been foremost in my mind and work at our hospital for a number of years, some of which I think are foremost also in the minds of many other colleagues. The first of these subjects is the diagnosis and treatment of cholecystitis; the second that of thromboangiitis obliterans which was discussed at the general meeting last night. I shall then say a few words on cancer in general and on the end-results of operations for cancer of the breast, and, lastly, on the surgical treatment of pulmonary tuberculosis, a matter which is coming to the forefront in our country with leaps and bounds. I shall have to ask you some leniency with regard to time as these are all rather important subjects.

DIAGNOSIS AND TREATMENT OF CHOLECYSTITIS

I would first like to throw some light on the subject of cholecystitis from the point of view of the internist and specialist, and in order to do this I have asked Dr. Einhorn to speak to you on this branch of the subject.

THE HELP DERIVED FROM THE DIRECT EXAMINATION OF THE BILE IN GALL-BLADDER DISEASES

Dr. Max Einhorn

The diagnosis of cholecystitis is at times easy when it presents definite symptoms. Everybody knows, however, that gall-

bladder troubles occasionally can progress and go on unrecognized, because they simulate many other diseases For this reason it is of great importance to be clear about the clinical symptoms and objective signs so that we can make a corroborative diagnosis in easy cases and clear up points which tally in difficult diagnoses

We often find evidence of pain in the right upper quadrant when stones are present. But suppose there are no stones, and suppose other clinical signs are missing? You might be led to say that there is no gall-bladder trouble, and for this reason it is very important to have other means for diagnosis.

We can obtain the biliary secretion and see if it contains abnormal elements Some years ago I made a practice of examining the bile in cases in which gall-stones were found at operation I looked at the bile before the patient was operated on and examined the bile from the gall-bladder, aspirated after operation, in order to get a standard of comparison. I found in 16 out of 18 cases in which gall-stones were found that the bile was turbid In cases of occlusion of the cystic duct, the bile was clear in one case and did not show any abnormal elements. In another case of occlusion of the common duct no bile got through at all

This line of work was continued and later on I worked up a series of cases in conjunction with Dr. Willy Meyer I found that even if there are no stones, but if the bile is turbid and contains a great many cholesterin crystals and often bacteria and pus cells, this points to a diseased gall-bladder. This, in conjunction with other evidences of the disease—for it must be borne in mind that we cannot make a diagnosis on one set of signs alone—will give us a basis for a diagnosis There must be sufficiently annoying subjective troubles present besides objective signs before we are justified in recommending operation If these other signs and symptoms are found, then operation is recommended.

We had a group of cases in which the bile was examined before operation and in which we thought gall-stones existed. These were operated upon and described five years ago. I

think a diagnosis of gall-bladder disease can be made from the findings of the examination of the bile in the fasting condition in conjunction with clinical symptoms.

Lantern Slide Demonstration.—The first five slides show the characteristic picture of bile with a sediment. If there is very little sediment, we centrifuge the bile and obtain a small quantity of precipitate The microscopic examination shows large clumps of cholesterin and also occasionally pus cells.
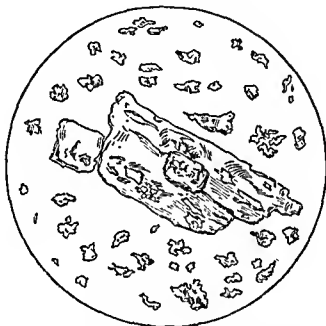

Fig. 167.—Mr. J. G. R. March 30, 1921. Bile, yellowish brown, very turbid microscopically; very big and medium-sized cholesterin crystals found

This patient (Fig. 167) was not operated on. The illustration is made from the aspirated bile as seen under the microscope.

The examination of the duodenal contents in the next patient (Fig. 168) showed the presence of large clumps of cholesterin crystals and pus cells. This patient was operated upon and stones were found. When we scratched the stone the microscopic examination showed similar findings, viz., large clumps of cholesterin and pus cells.

This (Fig. 169) was taken from a patient with gall-bladder colic. The sediment of the bile shows cholesterin crystals. She was operated upon by Dr. Meyer.

These slides (Figs 170, 171) show scratchings of the stone with big bunches of cholesterin crystals and pus cells.

In the past few years I have noticed tiny black particles in the bile sediment. These are sometimes as hard as stone, sometimes mushy. They are composed of biliary sediment embedded in organic matter. If examined microscopically they show remains of crystals These are easily overlooked. If examined

Fig 168.—Mrs J F. February 19, 1923. Bile, dark brownish yellow, very turbid, containing many cholesterin crystals. At operation gall-bladder found filled with stones

under the microscope they show what we call "bunch-berry" formation They are like the bunch berries found in the mountains (Fig. 172). Bacteria and mucus are also present This patient was operated on and in the gall-bladder black, sand-like particles were found (Fig. 173) Another patient shows the "bunch-berry" formation more clearly. In this case (Mrs. F.) 5 stones were found in the gall-bladder at operation and a scraping of the stones showed the "bunch-berry" variety of crystals These latter particles are of great importance with regard to the diagnosis I want to emphasize the

importance of this method of examination with regard to symptoms. The method is a great help in diagnosis.

We had a patient who had complained for twelve years of attacks of dyspnea and also several attacks of pain in the left side of the chest. She had a feeling that she was going to die from the constriction in the chest. She had attacks of dizziness and very severe attacks of pain lasting one-half hour. After two years the attacks became very frequent. I was called in. The attacks looked like true angina pectoris. The woman was fifty-five
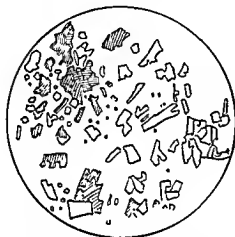

Fig. 169.—Mrs. D. S. April 2, 1923. Bile obtained at operation very dark, almost black and turbid. Microscopically, big cholesterin and biliary salt crystals.
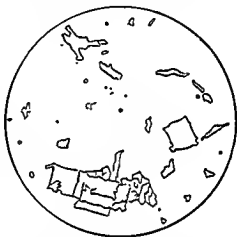
Fig 170.—Mrs. D. S. April 2, 1923. At the operation numerous calculi were found in the gall-bladder. Numerous cholesterin crystals, similar in structure to Fig. 169.

years of age. I suggested a very careful systematic examination at the hospital. The physician in charge had a sister-in-law who had been operated on for gall-stones and was much relieved. So he took great stock in these examinations. I found a very high acidity in the gastric juice, the string test was negative. Usually in gastric ulcers we find something with the string test. There was also deformity of the duodenal cap. The bile was very turbid in this case and showed "bunch-berry" like formation. The patient was operated upon. It was difficult to find anything in the gall-bladder even on palpation; but after long

and careful search we found one tiny stone in the gall-bladder.
We took it out and preserved it, and I have brought it here
today to demonstrate how small a calculus can cause a whole
train of symptoms This is of great diagnostic significance.
This lady since operation feels well and has no more attacks.

These cases of angina pectoris are occasionally met with in
successful business men If you take such a man away from his
business you spoil his entire career It you can discover that
such symptoms are due to gall-bladder disease you can do very
much for the patient In one such case, a man of about forty-

Fig 171 —Mrs D S. April 2,
1923 Another scraping showed
cholesterin crystals of very similar
type, as Figs 169, 170

Fig 172 —Mrs. B. September 27,
1923 Bile, dark yellow, greenish,
very turbid, small sand-like par-
ticles found

five years, the heart specialist found auricular fibrillation and
his trouble was diagnosed as true angina pectoris. However, I
suggested operation for the removal of the gall-stones, and the
man has been well ever since. I would therefore advise in any
case of angina pectoris, where the etiology is not very clear,
that the bile be examined with regard to gall-bladder disease.
In any case, you can do no harm by examination of the gall-
bladder and you may do a great deal of good and cure the
patient.

Dr. Willy Meyer.—The chapter of cholecystitis is a large one. I will confine myself today to a brief discussion of diagnosis and treatment, excluding cases in which jaundice is present. The careful taking of the history is, as you know, a prime factor. If you commence with taking a thorough history of the case, your thoughts will often be led promptly in the right direction. Then insist on a thorough clinical examination in every instance. There should be a systematic procedure of examination of the abdomen in complaints with reference to the

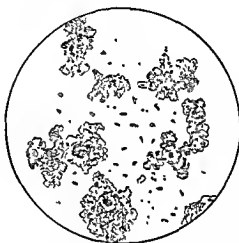Fig. 173.—Mrs B. October 3, 1923. Black sand-like particles found in the opened gall-bladder.

Fig 174.—Mrs. F. October 9, 1923 Dark brownish yellow, very turbid, calcium bilirubin and cholesterin crystals; mucus.

right quadrant or the upper half of the abdomen. Many patients have pathology in the upper half, but subjective pains in the lower. In my abdominal examination I always begin with palpating for the kidneys You will frequently find a movable kidney, especially in emaciated females, or you may find a swelling in the hypochondrium which will, on closer examination, often prove to be a permanent or intermittent hydronephrosis. I then test what I like to call "the left McBurney's point." Often I have been surprised to find tender-

ness in this place in suspected disease of the gall-bladder, even in subacute and chronic cases. I then go up in my palpation to the stomach region proper. There one may find slight tenderness over the epigastrium The gall-bladder region itself often is less tender On making firm pressure below the border of the right ribs on the right side one will not infrequently elicit some tenderness on deep inspiration If I then straighten out the second, third, and fourth fingers of the examining right hand and push these fingers suddenly upward under the border of the ribs, the patient will often cry out and say that it hurts If

Fig 175—Mrs F. January 14, 1924. Scraping gall-stones found at operation, cholesterin, bunch-berry and rhomboid crystals
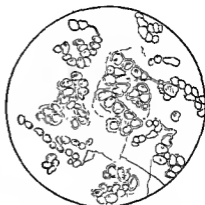
Fig 176—Mrs F Microscopic picture of scraping from gall-stones, removed by operation on January 14, 1924 Bunch-berry crystals

you do the same on the left side there is no pain. I then place the left hand on the lower ribs and tell the patient that I am going to hit my hand Such hitting of the hand resting on the lower ribs frequently hurts the patient on the right side only. After this, I proceed to examine the region of the appendix. Frequently, that is in at least 33 per cent. of the cases, chronic appendicitis is combined with gall-bladder disease.

That, then, has been our first impression at examination. After this follows the laboratory assistance. Differential diagnosis in cases with suspected trouble within the right upper quadrant

will principally cover gastric or duodenal ulcer, including malignancy of the stomach, disease of the right kidney, or of the pancreas, appendicitis with its frequently referred pain, and pathology of the gall-bladder with and without affections of the liver. In the sequence of laboratory tests, after blood and urine examinations, we might start with determining the cholesterin content of the blood. This, however, has been shown to be unreliable. I have discarded it. We then have the x-rays. Unfortunately the result is not so reliable in diseases of the gall-bladder as in disease of the gastro-intestinal tract, the principal reason being that the gall-bladder is side tracked anatomically from the gradual descent of the barium meal. The radiographist will make a systematic examination of the organs just referred to by means of photographs and with the fluoroscope. The series of films will often show stomach and duodenum normal. The duodenal cap may be distorted, due to existing adhesions in its neighborhood. A strict differential diagnosis between cholecystitis and duodenal ulcer with the help of radiography is often impossible.

Clinically, we may have cholecystitis with stones and cholecystitis without stones; both can give absolutely the same symptoms. If we were able to show the stones on the films in every case of cholelithiasis, it would be wonderful; but so far we cannot do this. A questionnaire sent out to prominent radiographists of our country a few years ago proved quite a divergence of opinion regarding the frequency of successful demonstration of gall-bladders harboring stones. It seems that 15 to 25 or 30 per cent. positive results is a fair estimate. Interference with the distinct contours of the duodenum, in the absence of radiographic and clinical positive findings for ulcer, speak for affection of the gall-bladder. Still both troubles may be associated.

Recently Graham, of St. Louis, has done excellent work with intravenous injection of tetrabromphenolphthalein. The method is very promising. It shows the clear outlines of the gall-bladder on the film and stones oftener and better than without the injection. The method represents a distinct step forward in our

diagnostic capabilities Investigation with it is continued everywhere [1]

When these laboratory means have been tried, today we still have, fortunately, the examination of the duodenal contents in the fasting condition of the patient with the help of Einhorn's duodenal tube To allow the tip of the tube to lie right in front of Vater's papilla in waiting for the bile to descend into the empty duodenum and also for the descent of the pancreatic juice represents a most important addition to our resources. The idea certainly is fascinating that we are able today to collect and examine the bile as it is physiologically discharged into the duodenum, and also to examine it for the presence of the pancreatic enzymes. It seems that many colleagues hesitate to resort to this procedure on account of the slight annoyance of the brief presence of the tube to the patient. Personally, I consider the method a great step forward I advocate it, inclusive of the string method, regularly if I am in doubt

I agree with Dr Einhorn that this examination should best be done in the fasting condition of the patient Often it will reveal many points that cannot be ascertained otherwise and will thus clear up some of the diagnostic difficulties It also allows us to test the function of the liver, which latter is not so infrequently involved in the pathology present.

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[1] Within the last six months great progress has been made in this chapter Inasmuch as many patients complained of various annoying, sometimes severe, symptoms after the intravenous administration of the drug, many hospitals discarded the method altogether Others continued investigation, in order not to lose the useful diagnostic nucleus of the procedure, among them the Lenox Hill Hospital

In an unselected series of cases it was shown and brought out at one of the recent meetings of the Clinical Society of that institution, that tetraiodophenolphthalein, the drug originally tried by Graham, but abandoned on account of its more serious effect on intravenous injection, gives better results radiographically, than the brom-derivative It is introduced either by the duodenal tube or by mouth in pills, the cover of which becomes dissolved only after they have passed the stomach Satisfactory positive results have been regularly obtained in upward of 20 cases In every one normal and diseased gall-bladders were clearly shown as regards size, contours, possibility and time of emptying, etc If further corroborated, this would mean a very great advance A more detailed communication by Drs. Einhorn, Stewart, and Ryan will be forthcoming in the near future.

I admit that these various examinations require some time to be carried out. They also cost some money when treating private or semiprivate patients. But the scientifically working medical man will be ready to advise their addition. I personally favor all efforts to refine the diagnosis before we go ahead with the abdominal operation. I abhor the practice of seeing a patient at the office in the morning and having him on the operating table at some hospital in the same afternoon.

Let me not forget to state that, in spite of all these resources of clinical examination and laboratory assistance, of all the gall-bladders with stones only a comparatively small percentage come to operation today. The other cases, sailing under the flag of "chronic indigestion," "gastric hyperacidity," etc., go to the grave without a refined diagnosis, with the stones in the gall-bladder. Often the stones are the cause of their going to the grave.

Let me also mention in this respect the so-called pseudo- or false angina pectoris, discussed before by Dr. Einhorn. In course of the years I have seen quite a number of these cases. The pain is always on the left side, in the left breast, in the left shoulder. At first I was puzzled. I found no increased blood-pressure, no cardiospasm; the stomach was normal; there were no signs of appendicitis, of chronic pancreatitis; no enlarged spleen; no renal disease. Yet there were severe intermittent pains on the left side that did not seem to be merely functional. I am more experienced today. When the examination of all the organs just mentioned has been negative, I think of the gall-bladder, and then try to prove it diseased. If proved, it is clear that we have to deal with a referred pain.

If a patient with chronic inflammation of the gall-bladder containing stones is opposed to operation, we may improve his condition by careful internal medication, proper diet, keeping the bowels in order, etc. Many of these people are benefited by taking the Carlsbad cure, which improves the circulation of the liver, the largest gland in our body. Some of these patients, with proper care, may run along for years, rarely entirely well. Some of them are bound to come to operation, when they become sick

and tired of diet, of their symptoms, and of continued medical supervision and treatment Let us emphasize that the surgeon has a right to encourage these patients to have an operation done, for 97 to 98 per cent. of them recover after cholecystectomy, irrespective of age, as long as we can operate in the interval and without the presence of jaundice

A gall-bladder without stones is much more difficult to treat medically than one with stones It represents a chronic focus of infection just as do diseased teeth or tonsils In fact, there is, I believe, no worse focus of infection than the diseased gall-bladder without stones. Typhoid bacilli may habitate the gall-bladder for twenty-five years and longer. If not operated upon, the infection of the gall-bladder may gradually affect the vagus and sympathetic system Severe systemic conditions may be the result of such chronic infection of the nervous system. Therefore, if our laboratory means have shown the gall-bladder to be a focus of infection, it should be removed, even if it does not contain stones and does not appear diseased on direct ocular inspection during laparotomy. If left behind, or merely drained, it may be the direct cause of chronic invalidism of the patient in the future.

The best incision is from the xyphoid process through the right rectus downward. This allows us to inspect the gall-bladder and liver, the duodenum, the greater portion of the stomach with pylorus, the colon, and small intestines, it permits of palpating cardia and pancreas. Usually we can pull the appendix up into the wound and remove it If necessary, the incision may be lengthened downward We have plenty of room to see what we are doing.

THROMBO-ANGIITIS OBLITERANS

THE conservative treatment of threatened gangrene of the extremities has been in the foreground of medical and surgical interest for many years.

There may be a fulminating acute gangrene, when suddenly a clot from the left heart is thrown, for instance, into the brachial or into the external iliac artery, clogging their lumen completely. Such accident causes sudden extreme pain, acute gangrene, often death. Helpful points in the diagnosis are: the extreme, sudden pain, a snow-white color of the extremity and absence of pulse in the same. In these cases artificial arterial hyperemia by means of superheated air is the treatment of choice. It should be employed at once. Endeavor to establish collateral circulation in order to prevent gangrene. The sooner this artificial arterial hyperemia is resorted to, the better. I was able to prevent by these means gangrene even of a fraction of an inch in the case of a lady whom I saw shortly after embolism of the brachial artery had occurred.

Of the chronic types of gangrene, the arteriosclerotic (senile), the diabetic, and syphilitic, further, that still mysterious class due to spasmodic contraction of the blood-vessels known as Raynaud's disease, and the still more mysterious thrombo-angiitis obliterans come into consideration. Often a combination of these types is at the bottom of the trouble. Leo Buerger has called the disease thrombo-angiitis obliterans, expressing with the two end-syllables "itis" that he believes in the inflammatory origin of the trouble. He still adheres to this etiologic conception as was only lately again brought out in his recent learned book on "The Circulatory Disturbances of the Extremities"

Personally, I do not believe in the theory of inflammation by infection in this disease, except that the one of the two chronic specific inflammatory diseases, the syphilitic, of the

hereditary or acquired type, likely plays an additional rôle in
many of these patients. I believe that what we call thrombo-
angiitis obliterans in younger patients is principally due to
tobacco-smoke poisoning Everyone of the patients, thus
afflicted, whom I have come across, when taking up the history,
has been a heavy cigarette smoker, usually from early youth on
If this etiology was not proved, then I do not place his trouble
under the head of thrombo-angiitis obliterans. I then try to
find out other causes to which the development of his disease
may have been due.

Typical thrombo-angiitis obliterans occurs principally in
Jews who have migrated from the other side, some come from
the lands between the Baltic and the Black Sea, especially in
those of Russian and Polish extraction The disease is seen only
in the male, not in the female, in younger individuals from twenty
to thirty-five years. In older men it is often associated with
arteriosclerosis and then has a different picture It is, to my
belief, also often combined, as mentioned before, with a mild
type of (usually) inherited specific disease.

Years ago I was called upon to amputate for thrombo-
angiitis obliterans the thigh of a man who had already lost the
other leg These patients suffer such intense pain that they often
scream from agony Morphin does not help them Amputa-
tion is the only choice. They will agree to any advice given in
order to find relief I once saw also a man who had lost all his
four extremities I then became interested and tried to help
solve the problem of the disease After a thorough study I
came to the conclusion, stated before, that it is caused prin-
cipally by tobacco-smoke poisoning Most of these cases are
seen in younger males I have always found a history of pro-
longed, often excessive smoking of cigarettes Some began as
early as eight or nine years old and kept up the habit ever since.
The majority of these patients inhale the tobacco smoke and
are consequently poisoned all the more. There is a great oppo-
sition on the part of other workers in the field to this view of
mine. But I believe I am right. Opposition, of course, is
welcome. It stimulates discussion. At a discussion following the

reading of my paper a colleague related that some time ago he attended the clinic of the late Prof Hoffa of Berlin. The latter presented a case of gangrene of the foot and introduced the patient as one suffering from "the Jewish tobacco disease." I was very glad, indeed, to hear by chance the independent expression of the same view I am holding on the part of another colleague of experience. Today others are beginning to accept this etiology.

This type of disease hardly ever occurs in patients of any other race It is very, very rare in the Gentile, but may occur among very heavy smokers. I remember the case of a Christian Polish gentleman, belonging to the aristocracy, a very heavy smoker who had been out hunting. On the home tramp he had his first attack of claudication. Then he got trouble with one foot, with partial gangrene of a toe Eight years ago I had seen this also in a patient of Anglo-Saxon extraction; he came from the State of Mississippi. He also had been a very heavy smoker of cigars and cigarettes for years. He gave up smoking definitely and was treated conservatively; the partial gangrene of two toes healed He is entirely well today.

However, tobacco-smoke poisoning alone will not produce the disease. Otherwise it would be found much more frequently. "Something else" must be added to it. This "something else" evidently is a disturbance of internal secretion (adrenals and parathyroids; probably also the pancreas) which, as is well known, is principally governed by the sympathetic nervous system.

The region of the globe which produces these cases principally has been overrun by invading armies for many centuries. Many of the Jewish inhabitants have been killed in pogroms and have been otherwise abused by the conquerors. No wonder that the nervous system, particularly the sympathetic nervous system, became involved, that syphilis was often transmitted, and may still play an etiologic rôle in later generations in spite of the so-called "negative Wassermann."

At the session of this Congress many papers have dealt with

the sympathetic nervous system. Many proofs have been already given that, as just stated, this part of the nervous system has the most to do with the glands of internal secretion. A perfect balance of internal secretion means health. If the balance see-saws up or down, to hyper- or hyposecretion, we have pathology. The growing study of this system is a very big task, but it promises to elucidate the origin of many diseases.

Several years ago I read a paper before the Surgical Section of the American Medical Association with reference to the sero-logic and chemical aspects of the disease as found at our hospital.[1] When 100 gm. of glucose are taken by mouth, a temporary influence upon the blood-sugar content of the blood sets in. In healthy people the blood-sugar rises to 0.15 and returns to normal or subnormal after two hours. The blood-sugar curve in diabetics is also characteristic. The blood-sugar curve of patients suffering from thrombo-angiitis obliterans is between the normal and the diabetic curve, pointing to a positive involvement of one or more of the glands of internal secretion that govern the sugar metabolism.

Another interesting point noted by us is that while many of these patients are looking profoundly anemic, perhaps from continued sleeplessness and pain, yet the blood test often reveals a hemoglobin content of 95 to 100 per cent., and often more than 5,000,000 to 6,000,000 red blood-corpuscles, and a proportionately high count of blood-platelets. They all belong to a special (rare) group with reference to blood transfusion.

I would now like to present briefly two patients, one of them illustrating the result of absolutely conservative treatment, and the other, the result of more radical, yet conservative, surgical work. The first patient is a man who twelve years ago at the age of twenty-seven had an ingrowing toe-nail removed by another surgeon. The ulceration with partial gangrene of the toe refused to heal, although the pulse of the anterior tibial artery and of the peroneal artery could be well palpated at the foot-joint. The wound was extremely painful, more at

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[1] Etiology of Thrombo-angiitis Obliterans (Buerger), Jour. Amer. Med. Assoc., October 19, 1918.

night; he had to spend his nights in a chair Not knowing of any better advice, I at last suggested amputation; but the patient refused. What to do? Just at that time I had read of a conservative treatment by means of hypodermoclysis for the purpose of changing the viscosity of the blood. I, therefore, cauterized the wound with the actual cautery under general anesthesia, put on an aseptic dressing, and started promptly with hypodermoclysis, using 1 to 2 quarts of Ringer's solution every other

Fig. 177.—The big toe and portions of the adjoining ones are missing on either foot They have been cast off by recurrent gangrene after the formation of a demarcation line. The scar covers the bones without showing any tendency to ulceration.

day. I did not touch the dressing. To my surprise the former pain disappeared at the end of the second week, and when we removed the dressing for the first time after fourteen days, there was healthy granulation. The wound then healed quickly, so that the patient was able to work again. But he suffered often from claudication, that often cited ischemia of the muscles of the calves, the one symptom that is hardest to cure. In the course of years the patient had many relapses; at one time he demanded amputation above the knee, but this time I refused.

I was beginning now and then to see results from the more improved conservative treatment He took this for a number of years Today he has still both his extremities (See Fig. 177)

Regarding the introduction of large quantities of fluid at regular intervals over a longer period, it will be seen in practice that such patients can be infused hypodermically for a comparatively brief time only

Today we use the duodenal tube to "wash out the system," as we call it, increasing the amount gradually until we instil at least 2 quarts of Ringer's solution by the rapid drop method every three hours, six times in the day We commence at 7 A M and stop at 10 P M, so that the patient gets 12 quarts a day The solution runs into the duodenum and is passed off mostly by the bladder, sometimes also by the rectum in the shape of diarrhea The latter can usually be controlled by small doses of laudanum Eleven quarts, more or less, are passed by way of the kidneys to prove that the fluid passes through the circulation and is then eliminated The patients receive full diet, they quickly learn to eat and drink alongside the tube and to chew without biting the tube Besides, they get daily prolonged warm foot-baths followed by hot-air baths and antispecific treatment adapted to the individual case At the end of the third week the pain not infrequently disappears, even in severe cases, and the patient again begins to sleep in bed He learns and is made to grasp that this therapeutic régime at the hospital is only the beginning of the treatment One cannot cure in three weeks what has been going wrong for many years At home this cycle of treatment is repeated every three to four months for a number of years

This briefly outlined conservative treatment is effectual in a certain percentage of the cases only Not infrequently amputation has to be done in spite of carefully conducted conservatism. Lériche's periarterial sympathectomy may be tried before amputation is resorted to

For younger individuals afflicted with thrombo-angitis obliterans another operation than amputation, to my belief, comes in for consideration This is the method of the so-called

"reversal of the circulation," by anastomosing the proximal portion of the femoral artery with the distal portion of the femoral vein after transverse division of both vessels in Scarpa's triangle. This second patient came under my care eleven years ago. He was then twenty-nine years old, had gangrene of the

Fig 178 —Illustrates a case of reversal of the circulation in a patient twenty-nine years old The proximal portion of the femoral artery has been anastomosed with the distal portion of the femoral vein. The longitudinal scar corresponds to Scarpa's triangle Defect of big toe with its metatarsal bone after gangrene The patient was completely cured and is well at the present time, eleven years after operation. He is able to walk many miles without becoming fatigued.

big toe and metatarsal bone, with tremendous pain. He had been a heavy cigarette smoker for years. In this case I exposed and isolated the femoral vessels in Scarpa's triangle, incised the common sheath longitudinally, cut transversely through artery and vein, and then, after ligation of the distal end of the artery and the proximal end of the vein, anastomosed the proximal

stump of the artery with the distal end of the vein (May, 1913). There was primary union (Fig 178) At first the original severe pain continued and I thought the local gangrene might be the cause. Therefore, fourteen days later, I operated on the foot, removing the first metatarsal bone with the big toe (Fig. 178) The former pain stopped The interesting point was that during this second operation *I had to ligate bleeding vessels.* Naturally there was no spurt; but so much "arterial" blood came down through the branches of the femoral vein that I had to put on several ligatures.

I realize the truth of the statement, made by others, that the experience in one case does not prove very much Still, one straight, positive clinical observation on the living subject has, to my mind, greater weight than 100 negative tests made experimentally on freshly amputated limbs or on the cadaver To my regret I did not find the time to repeat this operation in other patients My interest was taken up by various other chapters of operative surgery I do hope the younger generation of surgeons will take up this important question and not allow it to drop into oblivion

Last night at the general session of the Congress it was stated that the effect of arteriovenous anastomosis was due to Lériche's periarterial sympathectomy I do not agree with this view. In this, my case, I opened the common fibrous sheath, which surrounds both vessels, only and then cut straight across the femoral artery and the femoral vein, including, of course, their adventitia, before anastomosing artery to vein That was certainly not Lériche's operation

To my mind, cases of this type to be submitted to bloodvessel anastomosis must be carefully selected, the patients ought to be young individuals, in whom arteriosclerotic changes have not yet set in.

This patient here before you was absolutely cured by the operation. He walks any distance without pain and "without the appearance of claudication," which latter point I have so far not been able to observe in a single patient suffering from thrombo-angiitis obliterans, treated conservatively without opera-

tion. Of course, this patient has given up smoking, since our later investigations made us state that tobacco smoke poisoning plays a rôle in the etiology of thrombo-angiitis obliterans.

But the complete etiology of the disease has not been evolved so far. The disease is still one of the mysterious type. To my mind, it should be investigated by a joint committee or a group of scientists, by co-operation of physiologist, pathologist, chemist, internist, and surgeon. So-called round-table conferences will not solve the problem. Some rich man or institute should provide a fund for the purpose, so that those giving their time, knowledge, and skill for the research into this disease should be remunerated. All members should be young, progressive, enthusiastic.

Regarding therapy, I am convinced, as repeatedly stated, that the most important point is to have the patients stop smoking. I make them give me their solemn promise in the presence of others at the outset of the treatment at the hospital. If they are weak enough not to keep this promise and are caught smoking they are promptly discharged.

The principal point, of course, is to try to prevent the development of the disease, to promulgate among the younger generation of Jews coming from foreign lands the danger of persistent smoking of cigarettes in large volume. It is certainly easier not to indulge in this pastime than later on to lose one or more of the extremities.

ON CANCER IN GENERAL AND ON LATE RESULTS AFTER THE RADICAL OPERATION FOR CANCER OF THE BREAST. REMARKS ON COLONIC ANESTHESIA

At this time, when numberless experimenters, investigators, physicians, and surgeons are busy trying to find the etiology of cancer, its artificial production in the laboratory, its best therapy by operation and x-ray treatment in the clinic, it may be appropriate to pause a moment and see where we stand at this time, and to ascertain what has been accomplished

Unquestionably, cancer is still a mysterious disease, particularly with regard to its etiology Those of you who attended the symposium on the cancer problem at the meeting of the Congress yesterday will have heard what a wonderful diversity of opinion exists as to the etiology of cancer. It is the old story Some believe in the parasitic theory, which is denied as impossible by others The cause of all this disagreement is that we do not know what cancer is We are guessing, and hope to find out what causes it. Many surgeons the world over believed for years that cancer is, and must be, of infectious origin, although the "infectious something" was totally unknown. They persistently looked forward to the finding of a micro-organism, a bacterium, a protozoon, as the fundamental etiologic basis of the disease. Many had formed such a belief because of the great similarity of gross pathologic conditions we find in the course of our work on the living subject. Miliary carcinosis of the peritoneum, for instance, can macroscopically often not be distinguished from a tuberculous peritonitis. The laboratory, the microscopist, has to decide. The deduction, then, seemed logical: tuberculous peritonitis is produced by the tubercle bacillus; why should an affection, such as carcinosis of the peritoneum, that the surgeon's eye cannot differentiate with certainty from tuberculous peritonitis, not also be produced by a bacillus, inasmuch as the invasion of bacilli into the human system is responsible for the causation of so many diseases?

Thus it has happened many times in the history of medicine that somebody has come forward with the statement he had found the solution of the cancer problem, that he was able to produce the serum which, by injection, would cure cancer in man But every time the final result was disappointment.

A few years ago Irving Smith, of Washington, found that by injecting certain bacteria into plants a tumor could be produced which by invading the plant tissue had all the earmarks of a malignant growth We studied his results we hoped that this would lead to finding the same thing in human beings, but here, too, we were disappointed

Lately the laboratory has succeeded in producing real cancer, for instance, on the ears of rabbits, on the back of mice, by continuous chemical irritation. Those who believe in the infectious theory then said· Yes, that chemical irritation has produced the sore, but it has not been proved that the chemical irritation has been the only factor; the chemical (tar) alone cannot produce cancer. Something has to be added, and this something is the cancer agent. But remember, gentlemen, this cancer agent has not been found so far Dr. Francis Carter Wood said in the symposium yesterday that he believes we shall never find a specific agent as the cause of cancer. I share this view. We certainly have lately advanced in what we call the cancer problem, but we are still far from having reached the goal.

In some diseases, for instance, syphilis, medical science could successfully treat the trouble before we knew its cause The same may occur with cancer. Let us hope so.

Pathologically and surgically we can claim that cancer is a local disease in the beginning (first stage) After a while it affects the group of lymph-nodes into which the lymph of the respective district is physiologically discharged (second stage). Then, at a time totally unknown to us, the cancer cell enters the lymph stream or the blood-stream, and is carried to distant regions, where it may produce the same tumefaction. We call these tumors metastases (third stage). The first two stages are amenable to the knife in a certain percentage of cases. For decades surgeons have succeeded in curing cancer of the breast,

of the face, of the stomach, of the colon, of the rectum, and of many other parts of the body and have worked out useful radical methods of technic for removing the new growth. We can claim today that we can *"cure"* a certain number of early cases by means of operation. This is an absolute fact But the so-called "virulence of the disease" determines the patient's fate. Metastases may have been disseminated very early. Then, of course, the surgeon's knife is powerless.

Lately some have criticized surgeons for attacking cancer at all. They say cancer is due to wrong diet. It may be that persistent mistakes in diet prepare the field for the development of the new growth. But after cancer has once become established, we cannot cure it with diet

Since the introduction of *x*-rays and radium it has been hoped that we can successfully treat cancer with radiation At present this question is in the foreground of scientific discussion. In the programs of many medical meetings there are papers comparing the results of *x*-ray and radium treatment with those of surgery.

But we want the best for the patient. We want to save the patient's life if possible. Therefore, we surgeons stand up firmly for the dictum that all tumors which appear to be operable radically belong to the surgeon, and what cannot be radically operated upon any more belong to the radiologist, or to both. Of course, there are a few exceptions; for instance, in cancer of the cervix uteri. The final result of the investigations of special scientific committees appointed for this purpose are awaited with keenest anticipation by everyone who is interested in this question.

Whatever may be the outcome of present-day discussions, in no class of tumors do we find the dictum, that the knife can cure cancer, more clearly illustrated than in cases of cancer of the breast. Ninety-eight per cent. of the cases occur in females, 2 per cent. in males For the benefit of the patient we must take for granted that in every instance the axillary nodes are involved, whether we can feel them or not. They must be removed with the breast in one mass.

In operating we should best keep away from the site of the

cancer, never enter the "enemy's camp" There are two methods
of radical operation, each involving a principle as far as the
deeper tissues are concerned. The several later modifications
of the incision of the skin are irrelevant These two methods
of operation are the Baltimore and the New York methods
Both were proposed independently in the same year, 1894
The Baltimore method of operating is different from the New
York method In the Baltimore method the surgeon starts at
the chest and works outward to the arm He separates the
pectoralis major muscle from the minor, he leaves a large portion
of the former and the minor behind. In the New York method
the surgeon starts at the arm and works toward the sternum.
He primarily divides the lymph-vessels in the axilla and ligates
the axillary vessels He cuts the tendon of the pectoralis major
muscle at its insertion on the humerus and naturally then has
to remove the *entire belly* of this muscle He always and every-
where keeps outside of the diseased area, as far as this is at all
possible. We can thus do a more anatomic, a more bloodless
operation. If we are so fortunate as to operate "in time," in a
case that is not "virulent," we certainly can cure such a pa-
tient Unfortunately, we do not get all cases early enough nor
of slight virulency

To my mind there surely occur cases in which the cancer
perforates from an original, perhaps microscopic, nodule into a
vein or lymph-vessel at an early date, and the cells then enter
the blood-stream in the same manner as tubercle bacilli from
tubercular foci may perforate the vein, and then be carried
through the circulatory channels with rapid and immense mul-
tiplication into distal organs invading the brain, the lungs, the
peritoneum, etc. Thus is produced the miliary type of the
disease, as acute tuberculous meningitis, the miliary pulmonary
tuberculosis, likely, also, tuberculous peritonitis It is evident
that cancer cells may also be carried by the circulation into dis-
tant organs, producing there local metastasis without such
multiplication and rapid development of the miliary type of
disease.

In the following survey I have collected the results in some

of my private patients. I have found that a good many of the patients were alive and well quite a number of years after

Fig. 179.—Photograph of the first patient operated upon radically, according to the New York method, on September 19, 1894, as she appeared in the spring of 1920 Today, at the age of sixty-eight years, she is still in perfect health, without any signs of cancerous disease.

operation. In New York with its every shifting population it is difficult, often impossible, to follow up ward patients. I have therefore made a survey of my private patients only. Since 1894

I have been doing the New York operation. Before 1894 I removed the breast with axillary fat and glands, and then added the complete extirpation of the fascia of the pectoralis major muscle After 1894 I did the radical operation. In following up the cases for the first time in 1904, I was surprised not to find a single case alive operated on according to the earlier, incomplete procedure, and, on the other hand, to find many patients alive and well after the radical operation The patient shown here in the slide (Fig. 179) is the very first in whom I did the New York type of the radical extirpation of the breast, in September, 1894 She happens to be the aunt of a well-known serologist of our city She had a neoplasm which was pronounced by the pathologist of our hospital as adenocarcinoma. She is alive and well today, after thirty years

I have always been trying to get a perfect functional result, viz , one in which the patient can raise the arm perpendicularly, the "Statue of Liberty posture," and is able to move it freely in every direction The illustration proves the patient's ability to do so. I do not consider it a good result if the patient cannot raise her arm completely The second case operated on after this method is also alive and well today, after twenty-nine years. Another is well after twenty-two years, others after twenty-one, thirteen, twelve, etc In every instance the diagnosis "cancer" had been verified by the pathologic examination of the specimen. One case had a local cancer beneath the clavicle, involving the first rib, thirteen years after operation. Dr F C Wood is still taking care of her at the Radiologic Division of St Luke's Hospital. Although he has said it is usually impossible for the rays to "cure" bone metastasis, yet this patient is alive, and the disease seems checked after four years of treatment In one patient, a female of seventy-four years of age, a consultant was opposed to operation on account of her age, but as she was getting worse her family physician as well as the members of her family insisted on surgical intervention I operated in 1913 and today the patient is in perfect health With careful asepsis surgeons get just as good results in old people nowadays as in the young. (See Annals of Surgery, 1920, lxxii, 177)

Five other cases have remained free from recurrence for four, six, eight (2), and sixteen years, and then died of other diseases. Another patient, a pronounced diabetic at the time of operation, was well six years after the same, when she succumbed to the diabetes without any signs of a recurrence of cancer. Still another patient, operated on for cancer of the right breast in March, 1899, returned to me in December, 1900, with a cancer of the left breast which I then also extirpated. She was well and free from recurrence in the spring of 1907, when last heard from, six and one-quarter years after the second operation. There are a few more similar cases of successful bilateral operations in my list.

Cancer in the first and second stages is, to my mind, a purely surgical disease. Yesterday at the New York Skin and Cancer Hospital Dr. George H. Semken presented a great array of patients on whom he had operated most radically for all types of cancer with remarkably good final results. They were alive from four to twenty-five years after the operation. He again emphasized that surgeons must study the anatomy of the lymphatics and the groups of nodes which belong to the organ to be removed at operation. If we do this and see to it that they are completely excised, we are giving the patient the best chance. If all surgeons would do real "cancer surgery" we would be able to cure a great many more patients than is done today, thus proving to the laymen by our results that the radically operable cases clearly belong to operative surgery.

Patients who refuse operation or whose trouble is beyond surgical help should be referred for primary treatment with the rays.

A final word regarding the use of anesthetics in operation for cancer. The same as many other surgeons, I have had occasion to observe the splendid results of Gwathmey's ether-oil colonic anesthesia, in which the ether is absorbed from the large intestine and from there carried to the liver, thence to the lungs and brain, producing a light analgesia. Often conversation with the patient can be kept up during the entire operation, yet the patient does not seem to feel nor remember having

experienced any pain   Colonic anesthesia properly employed
certainly means a great step forward

Another point worth mentioning is· Do not let us do steeple
chase surgery. If some one of your assistants watches the
clock and thinks of his meal time, he is not a good man to assist
If it is necessary to work in one case for three or four hours in
order to do careful work, you must do it. In such almost blood-
lessly conducted operations about the head, face, and neck under
colonic anesthesia for many hours, even old patients can be out
of bed on the next day and act as if nothing had happened

SURGICAL TREATMENT OF PULMONARY TUBERCULOSIS

THE last part of my clinic deals with the surgical treatment of patients suffering from advanced pulmonary tuberculosis.

Fig. 180 —"Schede's incision," exposing the upper ten ribs in their entire length. They are completely removed with their periosteum (Brauer-Friedrich operation)

The early stages of tuberculosis of the lung are best treated, as everybody knows, by purely medical and hygienic methods. Gentle compression of the diseased lung and putting it at rest

Zurich, in 1910, advised **to use only** the posterior half of Schede's incision (Fig. 181), and **to do the operation in two stages** in order to avoid the complication of pneumonia by aspiration. He took out the lower ribs first, **and about two weeks later** the upper ribs. In the same year Wilms, of the University of Heidelberg, suggested excising a short portion of the ribs only, near the spine behind, and the respective rib cartilages with a small piece of the rib in front, and then use the remaining portion of the ribs them-

Fig 181.—Brauer's operation The heavy black lines mark the place where the ribs are cut through in front and behind The portion of bone between the same is loosened within its periosteum and extracted The entire scapula then drops inward with the softened chest wall and assists in compressing the lung

selves for compressing the lung (Figs 182, 183) If this was not *sufficient*, he advised resecting, in addition, the sternal extremity of the clavicle

At that time Professor Brauer, the originator of the operation, had also been called away from Marburg. He went as Professor of Internal Medicine to the University of Hamburg and became director of the Hamburg-Eppendorf Hospital Here he did his own operating on the lungs as had been done by Prof. Lenhartz,

his predecessor in the same place. He excised a large piece of rib up to very close to the spine, and if necessary made another incision in front, then loosened the periosteum of the ribs with especially constructed raspatories, and extracted the ribs out of their periosteal envelopes (Fig 184). The scapula can then drop inward completely and assist in compressing the lung. Brauer's and Sauerbruch's modification of the original Brauer-Friedrich operation are termed "extrapleural thoracoplasty"; Wilms's procedure is called "columnar resection of the ribs." They are all able to put the lung at rest, the same as the artificial pneumothorax, and induce the rapid formation of connective tissue which encapsulates and at last substitutes the tubercles.

The results obtained by the three methods have shown that in patients who suffer from advanced pulmonary tuberculosis and cannot be treated with artificial pneumothorax on account of adhesions between the two leaves of the pleura, surgery can step in, and with the help of extrapleural thoracoplasty or columnar resection of the ribs improve or cure from 60 to 75 per cent. of them, provided the cases had been properly selected. Thus advanced pulmonary tuberculosis has become a border-line disease.

Lantern slides are shown illustrating operations done by the speaker.

The first case operated upon in two stages, in 1918, referring to a young man in the twenties, has been entirely cured. The patient is living in Texas, is happily married, and is able to climb the hills of that territory.

A second operation that promises to do much for these patients is the resection—with extraction from the chest—of the phrenic nerve. It paralyzes the respective half of the diaphragm. The diseased lung then rests on a soft pillow, viz., the half of the diaphragm which does not move automatically up and down any more, but has risen in consequence of its paralysis. It is thus disturbed very little by the act of respiration. The operation is indicated, as far as one is able to state, that at present, as a primary step in cases of obstinate hemoptysis, in the infiltrating type of tuberculosis of the lung without cavity formation,

and as addition to the prolonged cure with artificial pneumo-thorax. It is a very useful operation which is done under local and regional anesthesia, the same as many prefer to do when performing extrapleural thoracoplasty. Both operations, done alone or combined, hold out great benefits to these patients.

Surgeons in New York State, likely also in other states, are still greatly handicapped in doing these clearly indicated operations more frequently by a ruling of the State Board of Charities which was put on the Statute Books about fifteen years ago. This ruling states that patients with active tuber-cle bacilli in their sputum cannot be admitted to the public wards of our hospitals. This, naturally, was and still is a big stumbling-block. It means the expense of engaging special nurses. it means special feeding of those patients in rooms or wards set aside for the purpose, etc. It is hoped that in the light of improved knowledge regarding the possible infection of patients resting near a consumptive in the wards, viz , in the light of the non-occurrence of such infection in the grown, this ruling will soon be modified, if not rescinded.

Let me say, in closing, that these operations are not difficult technically. They should be taken up everywhere by the general surgeon. At the present moment it certainly is inspiring to see how a wave of enthusiasm with reference to surgical help in patients suffering from pulmonary tuberculosis sweeps over our States and Canada. Many patients who were considered to be beyond medical and hygienic aid can thus be restored to a good degree of health and ability to work, so that they—before often hopelessly lost—may again take care of themselves and their families.

NEW YORK POST-GRADUATE HOSPITAL

CLINIC OF DR. FRED H. ALBEE

Case I. Arthrodesis of the Shoulder.—I have chosen this case not because it is unusual, but to demonstrate a fundamental principle. Arthrodesis of the shoulder has a large field of applicability. We use it to overcome disease of the shoulder, such as the tuberculosis in this case, and also to make possible compensatory function in cases of paralysis by providing a better posture, and by making way for scapulothoracic motion to replace the lost shoulder motion.

We have a very unusual anatomic condition at the shoulder. The shoulder-joint is made up of the humerus and the scapula. The latter has distinct motion, and a large excursion of motion on the thorax, and is controlled by very powerful muscles. The amount of compensatory motion and function that may be obtained, under favorable conditions, from scapulothoracic motion in a case of stiffened shoulder-joint is surprising (Fig. 185). But in order to obtain this compensatory motion, the shoulder must be stiffened or ankylosed in a posture which will allow it, and this is where nature tends to do the wrong thing

(there are many instances of this in the various disturbances associated with diseases of the joints, nerves, and muscles). The posture which the humerus naturally takes, relative to the scapula, is practically always disadvantageous as far as the compensatory motion of the scapula on the thorax is concerned. This particular event is not necessarily stiffening of the shoulder-joint, but may be a paralysis of the external rotators of the

Fig 185 — Vocational opportunities made possible by arthrodesis of the shoulder

upper extremity, which allows the arm to rotate inward during the early developmental period. In later life, in cases of comminuted fracture in or near the shoulder-joint, or of disease or paralysis of the joint, nature produces a still worse posture. If you consider the forearm as a weight, what effect will it have on the rotation of the humerus? It will, of course, always rotate the humerus downward and inward, and this, unless it is defi-

nitely overcome by mechanical treatment, will always result in a contracture with the humerus rotated inward and adducted, no matter what the underlying condition happens to be. This contracture interferes seriously with function, in that any attempt to bring the hand to the mouth, face, or hair results in the elbow being awkwardly elevated beside the face, with the hand pendant.

In cases of disease of the shoulder-joint, whether or not operation is undertaken, I always immobilize the upper arm in an anterior elevated position, with the elbow at a right angle and the hand in front of the face; in other words, with the humerus outwardly rotated. In cases of Erb's palsy, I do not try to release the shoulder by doing extensive operative work at the joint, which would necessarily consist of tenoplastic and arthroplastic work, but do a much simpler operation. The humerus is severed at right angles with the shaft with a small motor drill and osteotome, just below the insertion of the deltoid muscle, and the lower portion of the humerus is rotated outward on the upper portion about one-half of a circumference. In this new posture, the patient receives the maximal benefit from whatever motion remains at the joint, and compensatory scapulothoracic motion is also made possible. I have no more satisfactory cases coming to me than such deformities attendant on Erb's palsy.

In cases of fracture of the upper end of the humerus, in which there is danger of resultant limitation of motion, the arm should be put up in the Albee posture, which has previously been described.[1]

In the past there has been no suitable means of holding the arm in the desired posture while putting on the immobilizing dressing. I prefer the plaster-of-Paris cast for this purpose, not only because of its superlative immobilizing qualities, but because of its influence in controlling postoperative hemorrhage. This same immobilizing dressing is used for high and low fractures of the neck of the humerus, requiring surgical treatment,

[1] Albee, F.: The Post-Graduate, March, 1908, and Orthopedic and Reconstructional Surgery, W. B. Saunders, 1921.

and also for all fractures of the upper half of the shaft of the humerus. I believe that this dressing offers all the temporary advantages of the aeroplane splint, and further affords more perfect coaptation splint control and therefore more satisfactory results, since it is tailor-made, whereas the aeroplane splint is largely custom-made.

The fracture orthopedic operating table which I am using is my own device, and has stood the test of several years' use. It was of great service and satisfaction all through the war, being the only table ever devised by which you can control the upper extremity in as varied postures, with or without traction, as you can the lower extremity. The former inability to control the upper extremity during the application of splints, and also throughout an operation, had a marked influence upon surgery of the upper end of the humerus and shoulder-joint. In preparing the patient on the table before operation, the metal back-rest is thoroughly powdered with talcum powder, so that later it will slip out easily from under the cast.

This patient is a man thirty-one years of age, with pain and limitation of motion in the right shoulder, which has gradually increased during the last eight years. The diagnosis is tuberculosis of the joint. In February, 1921 I removed a circumscribed part of the head of the humerus, which was directly under the acromion process. Somewhat to our surprise, the pathologic report was tuberculosis. The approach was by oblique severance of the acromion process at its base, with the motor saw, and the turning upward of the whole outer portion of the process, thus laying bare the upper joint contour of the head of the humerus. When the operation was completed and the acromion process turned downward, the oblique contact obtained by this method was very favorable to future union. The patient made an uneventful recovery. Recently, however, the pain has recurred, and limitation of motion developed, following manipulation under an anesthetic to secure increased motion. This was undertaken elsewhere, and not with my approval.

The operation which I am now doing is not only for the purpose of removing the tuberculous tissue, but also and equally

important, of securing an arthrodesis of the shoulder-joint. For this reason the approach is by a long incision, directly over the outer aspect of the shoulder-joint, bringing the tip of the acromion process in the line of the incision. The muscles and soft parts are freely and generously separated from the joint capsule The capsule is freely incised, and I find a great deal of fibrous tissue in the shoulder-joint, with caseous masses here and there. I am now right down on the acromion process and the head of the humerus. I am going to denude the head, and trust largely to the acromion process and the glenoid cavity for securing broad bony surfaces for union with the head of the humerus. I have removed a large amount of connective tissue from the joint space itself. With the Lambotte clamp the head of the humerus is held away from the glenoid, and down from the acromion Now with a sharp osteotome I am removing the hyaline cartilage from the glenoid cavity, and freshening the under surface of the acromion process in such a way as to present the broadest raw bone surface possible. With the same sharp osteotome I denude the head of the humerus completely of its cartilage. Now, with great care to keep all soft parts from between the bony parts, I am jamming the head of the humerus into the angle produced by the acromion process and the glenoid cavity. The soft parts are closed with a continuous interlocking suture of No. 0 chromic catgut, and the skin with the same type of suture of No. 0 plain catgut. After the skin wound has been thoroughly cleaned with dry gauze, the line of suture is thoroughly puddled with tincture of iodin, 3½ per cent.

I wish to call your attention to the fact that the patient's arm has been held in the elevated position with the hand in front of the face. In other words, the arm has been elevated anteriorly and rotated outward throughout the whole operative procedure, and during the application of the plaster-of-Paris shoulder spica, which is now being applied. As soon as the application of the spica is completed, we disengage the patient from the table by severing the muslin bandages which hold his hand to the arm of the traction bar, and by pulling the thin metal back-rest from below upward, while the patient is being

manually supported above and below the plaster Care is taken
not to lift on the plaster itself, as that would result in pinching
the patient's back between the cast and the metal back-rest.
The latter slides out easily, owing to the thorough powdering
before operation

Case II. Unusual Congenital Hyperplasia of the Feet.—The
next case that I am to demonstrate is an unusually extreme
hyperplasia of both feet, involving both legs, especially the left.

Fig 186 —Unusual hyperplasia of the first and second digits.

This young woman is about eighteen years old There seems to
be no possibility of tropical parasites, as she has never lived in
the tropics, having lived in Russia up to four years ago, when
she moved to Siberia Later she went to Germany, and four
months ago came to this country In all my experience, I have
seen only two cases which even approached the magnitude of
this case The patient, merely by rising on her toes, can in-
crease her stature nearly one foot, which certainly must be an
advantage when attending ball games Nevertheless she doesn't

seem to appreciate it. The measurements show that the right foot is 14 inches long, and the left 13½ inches. The tibia of the left leg is 1½ inches longer than that of the right. The first and second digits on each foot are tremendously increased in size; the third and fourth are also abnormal, but not to such a degree. The photographs (Figs 186, 187) and x-rays (Figs. 188, 189) indicate the tremendous size of the anterior portion of the feet in every way, including the metatarsal-phalangeal bones.

In planning operation in such a case, it is essential to consider what is practicable, rather than what is ideal. The patient

Fig. 187 —Size of patient's feet compared to those of a normal girl of eighteen.

has consulted about every prominent surgeon in Europe Some of them have proposed rather intricate operations, such as the removal of the central portion of the shafts of the metatarsal bones by very complicated cabinet-maker's procedures, allowing the remaining ends to be dove-tailed into each other Such procedures, while theoretically ideal, seem most unwise and impractical in this case because of the danger of infection, owing to the low grade, rigid tissues and the probability of their breaking down. Although theoretically the results might be better, the actual results would, I fear, be most unfortunate. I there-

fore propose to do the simplest operation possible· the removal
of a sufficient amount of the soft part of the foot to leave a
foot of normal length. Even with this procedure, one cannot
be too sanguine regarding the outcome owing to the low-grade
tissue.[1]
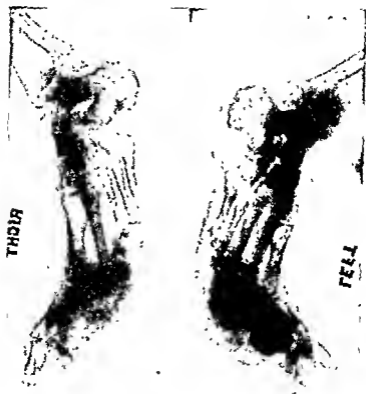
Fig 188 --x-Rays, showing extreme hyperplasia

Operation --I am removing the front part of the foot by
methods identical with those of amputation (Fig. 190), leaving
a long inferior flap and shorter superior flap, severing the bones
at a point which will make the foot of normal length for a girl

[1] This case was not operated on the day of the clinic, because of too much
material, but October 30th the operation was undertaken as proposed, and
is herewith reported

of eighteen years, after the severed ends are covered with the inferior and superior flaps. I am clamping every tendon as it is severed, and am implanting its end beneath the periosteum of the bone of the digit which the tendon formerly controlled. It is apparent that the front part of the foot will be a stump, with no toes (Fig. 191), but it will allow the patient to wear shoes

Fig. 189.—x-Rays, showing extreme hyperplasia.

somewhere near normal in size. As she was becoming hysterical because of her most unfortunate stigma, the mental relief afforded will doubtless counterbalance any physical discomfort.[1]

[1] *Postoperative Complications* (February 20th).—The fears expressed at the operation have proved justified because of the fact that, although the operation was simplified to the extreme, the plastic flaps sloughed to a slight degree, and have now entirely healed. The result is excellent.

Case III. Malunion of the Fifth Metacarpal of the Right Hand.—This little girl, who is nine years old, has marked malunion of the distal end of the fifth metacarpal bone of the right hand The fracture took place one month ago The chief question in these cases is how to immobilize the fractured fragment.

Fig 190 —Showing toes after amputation
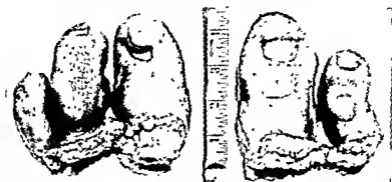

Fig. 191 —Reduction of feet to approximately normal size by amputation of front part of foot

Because of the smallness of the part in this child, the difficulty of the problem is increased.

Operation.—I approach the point of fracture by an incision directly over the posterior aspect of the fracture. With a small osteotome I am severing the union, which is rather soft, and

removing a wedge-shaped piece of callus and bone, so that when the fragments are placed in proper alignment, favorable apposition of the bone ends will be obtained. You will see that the bone ends come together nicely, and that there is no tendency to a relapse of the deformity. As the distal fragment is so small and short, I shall use both counterpressure and traction to control the alignment. I first attach circular bands of narrow adhesive tape, and allow the ends to hang free, one on the outer, and one on the inner aspect of the finger. Then a wooden tongue depressor with a carefully applied gauze padding on one side is placed on the dorsal aspect of the little finger and over the dressing on the dorsal aspect of the hand. This in turn is covered with a narrow bandage of plaster cotton, over which we place a carefully applied plaster-of-Paris bandage, which covers the rest of the hand, and the base of the little finger. The strips of adhesive plaster which were left projecting from the end of the little finger are now turned over the end of the tongue depressor and fastened. In this way, we secure complete control of the distal fragment, which is the one about which we are concerned.

The question is sometimes asked: "How long should one wait, in a fresh fracture of any kind, before operating, if good position is not obtained?" My own practice is with few exceptions, first to use every non-open method to get the fractured fragments into satisfactory alignment; this should not require more than two weeks. If, at the end of this time, I am convinced that conservative methods will not obtain the desired results, I resort immediately to open operation and place the fractured ends in apposition. I am strongly of the opinion that further delay is unjustifiable. The means of holding these ends in position vary considerably. Suffice it to say that in my own practice I employ mechanical mortising and the use of the kangaroo-tendon. I believe it is always a mistake to trust to the internal bone fixative agent, whatever it may be, to withstand end-to-end thrust to bone fragments, such as might occur in a very oblique fracture. With the motor saw one is always able to produce a mortise which will withstand the tendency to dis-

The problem, however, in civil life is entirely different. The gunshot wound and compound comminuted fracture with extensive loss of soft parts and the danger of gas infection is very uncommon, a large percentage of cases in civil life being simple fractures   The demands for results are much more exacting, and should be so   The surgeon should make the very best of the most ideal coaptation splint ever used, plaster of Paris, but in order satisfactorily to avail himself of its advantages he must have studied the fundamental principles involved in its use, and, above all, the technic of its application. The gauze bandage or the muslin bandage is the greatest source of danger, and yet there is still a tendency to use such bandages with the plaster-of-Paris cast   The application of circular gauze or muslin ban-
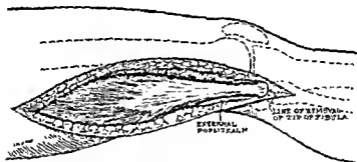

Fig 192 —Method of approach in transplantation of biceps femoris.

dages for any purpose, such as holding the dressing over which a plaster is to be applied, is to be condemned because, if there is the slightest swelling, these unyielding bandages may form a tourniquet, as has already been pointed out (p 450).

Case IV. Transplantation of the Biceps Femoris Into the Patella, and Bilateral Tenotomy of the Tendo Achillis.—This woman, who is forty-five years of age, had infantile paralysis seventeen years ago, which resulted in partial paralysis of both legs   Her family history is negative   It is difficult for her to walk, as the power of extension in the right knee is practically nil. I am, therefore, going to transplant the biceps femoris into the patella

Operation.—In this operation one should always be on his guard for the external popliteal nerve, which is in very close proximity to the biceps tendon, just posterior to it (Fig. 192). In some instances this nerve has not escaped injury in such operations as this; one must, therefore, be extremely careful. The tendon of the biceps femoris is, as you know, anatomically inserted into the head of the fibula, and we take a portion of the fibula with the tendon (Fig. 193), by means of the osteotome, to be used later as an inlay with the distal end of the tendon into the osseous substance of the patella. This insures better union.
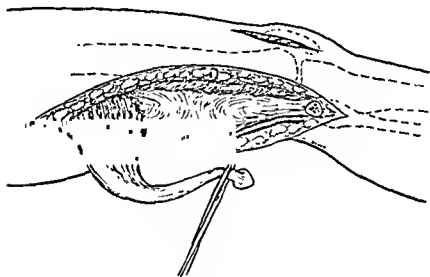
Fig. 193.—Showing tendon after it has been freed, with piece of bone in its end for inlay later.

In tendon transplantation one should always endeavor to obtain as straight a pull for the tendon as possible. I want to get the biceps femoris dissected up as high as is feasible, so as to get as straight and firm a pull as possible. The muscles are kept constantly moistened with warm saline compresses, to prevent drying of the tendon of the muscle. We turn up two small trap doors in the periosteum and bone of the upper, outer corner of the patella, rather than in the midline (Fig. 194); because of the anatomic location of the muscle, this gives a straighter pull. Here is the very dense and tense fascia lata.

It is possible to go through the subcutaneous tissue outside of
this, or to dissect here as I have, and go inside the fascia lata
(Fig. 195), which gives the tendon a very much better bed, and
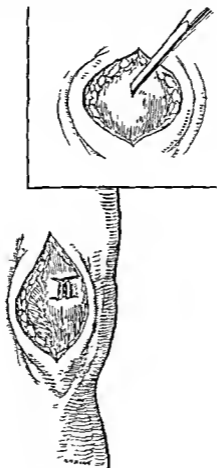avoids the mechanical disadvantage of pulling around a corner.

Fig 194 —Small trap-doors in upper outer portion of patella for insertion of
tendon

I am putting this piece of bone, which was removed with the
tendon, into the patella as an inlay (Fig 196) The muscle is
very red and healthy, with a strength of 4, and is well worth
transplanting. In testing muscles in the routine examination

preliminary to transplantation I use a scale of 0 to 4. If the muscle has low power, I indicate that by 1 or $1\frac{1}{2}$, according to the degree of power; 4 represents normal power. Of the five hamstring muscles, we are leaving four to perform their normal function.

QUESTION: Will you get any rotation of the tibia on the femur after this operation?

ANSWER: There is practically no tendency to it in adults, but there is some in young children. This is partly obviated, however, by placing the tendon end on the outer part of the
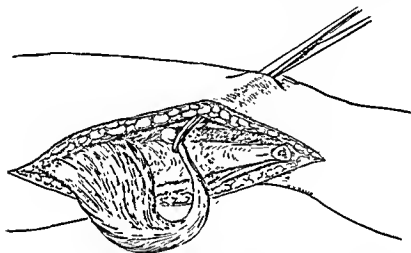
Fig. 195.—Drawing the freed tendon through the tunnel prepared for it inside the fascia lata.

patella, as just described. It is very remarkable how the cerebrum re-educates itself, so that a flexor muscle will become an extensor, and vice versa.

I have made a repeated over-and-over suture with No. 0 chromic catgut, thus avoiding to the maximum trusting to the knot in the suture. For the skin suture we use No. 0 plain catgut, and finish by applying tincture of iodin ($3\frac{1}{2}$ per cent.) freely to the line of suture, wiping off the excess. The idea is to get as much as possible to go not only into the suture holes, but into the incision itself, so as to bathe the edges of the severed skin on either side.

As this is a flaccid paralysis, we can safely do an ordinary subcutaneous tenotomy Where there is going to be an extensive amount of exudate, I always put sterilized cotton outside, instead of gauze, as gauze is very easily penetrated by blood and exudate and cotton is not. If gauze becomes saturated and comes in contact with this unsterile material, infection is likely to develop Dry gauze is impervious to penetration by bacteria,
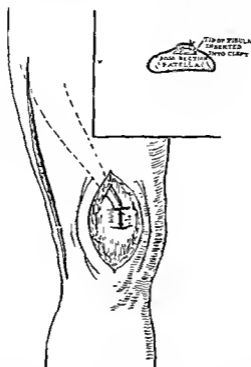
Fig 196—Closing trap-doors Insert shows inlay and kangaroo-suture

but when saturated with blood and exudate it is easily penetrated by living bacteria.

Case V. Bone-graft for Fracture of the Spine.—The next patient is an athlete, twenty-nine years of age Two years ago, while doing a broad jump, he turned in the air and came down with a great deal of force The resultant injury was diagnosed by the attending physician as a compression fracture of the

vertebræ This patient has suffered from weakness and pain in his spine whenever be attempted to lift. When lying in bed he is fairly comfortable, but if he moves he suffers twinges of pain along the distribution of the intercostal nerves. This makes him apprehensive of motion. There is no pain radiating down the legs.

You will see from the x-rays the crushing of the vertebral bodies in the vertical diameter. Is this distortion due to tuberculosis, or is it due to compression fracture of the spine? (The Wassermann reaction was negative.) Two years ago the patient had an abscess on the right side, which was opened elsewhere and healed. If the condition were tuberculosis, it would be unusual, though not impossible, for it to heal so promptly without appropriate treatment to the spine. Since we did not see the man during this early period, it is difficult to make a positive diagnosis between compression fracture and tuberculosis; but, fortunately, the treatment is the same in either event.

The treatment of such cases is always immobilization by internal surgical work, with or without the graft. Because of the smallness of the spinous processes, the meager amount of periosteum (owing to the fact that the spinous processes are covered with ligaments), and the constant respiratory motion the graft is particularly essential in such cases. Those of you who have done surgery of this kind may be surprised to find how frequently fractures of both the spinous processes and the lateral masses, usually due to direct trauma from a falling object, fail to unite. In 1910 and 1911 I tested on the dog the osteogenesis of the spinous processes relative to that of a long bone in the same dog, to determine whether we could trust the spinous processes alone to ankylose the spine. I found that there was a great relative insufficiency of osteogenesis on the part of the spinous processes. This is one reason why I have always chosen the bone-graft. There is another reason. Those of you who have done spinal work have been impressed by the fact that there is liberal motion between normal spinous processes, but there is four or five times as much motion between those acutely

affected with tuberculosis especially, in children. You have a vicious circle in tuberculosis of the vertebral body, and cannot possibly by external means prevent the motion of one vertebra upon another. The processes may be regarded as levers to which are attached both voluntary and involuntary muscles, for use in respiration

At operation in cases of acute tuberculosis of the spine, when one lays bare the spinous processes, with the patient in the ventral position on the operating table, it is found that there is a marked increase in the amount of motion between the spinous processes of the involved vertebræ, and it is reasonable to suppose that this excessive amount of motion would tend to increase if the spinous processes were severed at their base, as in the fusion operation. Prior to operation, any tendency to further emergence of the processes, with increased motion, is prevented by the tenseness of the ligaments   This tenseness acts as a really inhibitory influence to further abnormal motion. In the fusion operation, by cutting off the bases of the processes and thus relaxing the tenseness of the ligaments, we take away nature's means of preventing excessive motion, and we supply no immobilizing element to take its place. Therefore, instead of severing the spinous processes at their base, I conserve nature's immobilizing influence by splitting the processes longitudinally, and then insert into their substance a splint in the form of a bone-graft, thus reinforcing nature's immobilizing influence by mechanical device.

As to non-operative methods, it is impracticable to attempt to mobilize vertebræ by such methods, inasmuch as the vertebræ with their processes are deeply surrounded by the most massive muscles of the trunk. One can gain but slight control of the individual vertebræ by splints   Even the gas-pipe frame is frequently ineffectual. By external splintage one can only maintain the general alignment of the spinal column; he cannot hope completely to immobilize one vertebra upon another.

In all bone cases the fundamental principle of Wolff's law is at work, and its reaction upon the graft itself is of greatest service to the surgeon   He may depend upon it that changes in

the internal bone structure will occur in 100 per cent. of cases. The graft inserted into the spinous process according to the Albee technic is in a very favorable environment, principally for the reason that it immediately comes under the influence of mechanical stress, because of its immobilizing effect upon the vertebræ, which causes it to hypertrophy, and also because of its favorable vascular environment.

Operation.—You will notice that the third lumbar vertebra is the most prominent in this patient. I shall plan to include in the graft two processes above this, and two below it. I am going right over these five spinous processes with the scalpel, and am now using an osteotome which I have devised for this purpose. I am splitting the supraspinous and interspinous ligaments, the scalpel passing directly over the tips of the spinous processes, great care being taken to split and not to sever any of their fibers. With this ½-inch osteotome I am now separating the interspinous ligaments from the upper and lower surfaces of the split spinous processes. At the same time I am removing shavings of bone for the purpose of making way for additional osteogenesis, supplemental to the graft.

I am now procuring the graft from the left tibia. Please observe the various planes I am working with the motor saw. This rapid change of the direction of the saw-blade would not be permitted if it were on the end of a flexible shaft. It might seem superfluous to discuss the relative merits of the motor tool driven by a flexible shaft, and the one on the Amature shaft with an electric wire supplying the current to the motor, but this subject seems still to be unsolved in the minds of many, and new outfits using the flexible shaft are constantly being recommended in the literature. Over twelve years ago I spent a great deal of time at S. S. White Dental Company, studying with their engineers the problem of the flexible shaft as a means of driving the circular saw and large-sized drills into adult human bone. The conclusion reached was briefly this: if the flexible shaft was really flexible, it was not adequate to drive such cutting tools; if it was stiff enough to drive them, it was no longer flexible. I have cut out this graft on a curve. Now I am taking

off the sharp corners of the graft, so that they will not irritate the tissues and produce a hygroma. I am now inserting it into the spinous processes already split This is the dense fascia of the back, so strong that in many instances it has to be split longitudinally just outside of the kangaroo-sutures, so that the fascia can be drawn posteriorly over the graft

The postoperative treatment will consist of immobilization for a period of six weeks. with the patient in the dorsal position on a bed spring that is of ordinary rigidity, with a board beneath to keep the mattress from sinking. This affords as good immobilization as can be brought about, providing the patient is kept in the reclining position. Children have to be fastened firmly down on the mattress because they cannot be trusted to carry out directions At the end of the six weeks the adults are then allowed to be up without plasters or braces.

We are going to operate on a case of paralytic scoliosis next week in which the graft, used in a similar way, will be of the greatest service As the patient has a considerable amount of deformity, we have had a special frame made of gas pipe and ducking with special pads, and by producing constant lateral pressure day and night, we can overcome the deformity. Cases of paralytic scoliosis are particularly amenable to treatment by constant pressure. This case is not so extreme as some I have treated I had one in which the ribs had telescoped into the pelvis in a young man of twenty-two years The deformity was so extreme that I was satisfied we could never hold the pelvic obliquity and the telescoping of the ribs by any treatment directed to the spine alone. Therefore, in addition to the preliminary treatment, at operation I split the spinous processes, and instead of putting the graft into the spinous process with the largest cross-section diameter parallel to the spinous process, it was put in with this diameter at right angles to the spinous processes. By manual pressure the lateral deformity of the spine was largely overcome, this being made possible by the complete relaxation afforded by the anesthesia, using the graft as a splint lever to bring about the correction, and to hold it after it was made I then laid bare the tenth rib

(believing that the twelfth rib was not strong enough) and the crest of the ilium, and with some difficulty pulled the ribs out of the pelvis up to about 5 inches above the crest of the ilium, and put the bone-graft in, making notches in its end with the motor saw for mortises into the crest of the ilium and into the rib. This boy has gone on to a most unusual amelioration of

Fig. 197 —x-Ray revealing joint mice in knee

his condition. The graft has stayed in place, and holds the ribs so that they cannot get back into the pelvis.

Case VI. Removal of a Joint Mouse from the Knee.—The patient is a young football captain, twenty-two years old. It is not known just when the accident occurred which led to the

formation of the joint mice shown in the x-rays (Figs. 197, 198), but as this man has been playing football for some time, there have, no doubt, been innumerable experiences which might have caused it

My technic in carrying out this approach is as follows: The patella and the lower portion of the quadriceps tendon or liga-

Fig 198 —x-Ray revealing joint mice in knee.

mentum patellæ is laid bare by a median incision about 5 inches long. The ligamentum patellæ and the quadriceps tendon are split approximately in the center with a scalpel. With the Albee bone saw the patella is split about two-thirds or three-fourths of its anteroposterior diameter in the sagittal plane (Fig. 199). With a thin sharp osteotome placed in the saw-cut from below,

sharp blows of the mallet drive it upward, and the patella is
easily split. By directing the osteotome in this way, all injury
to the underlying cartilage of the femoral condyles is avoided.
I want to emphasize here the desirability of employing the
motor bone mallet as a constant asset in the orthopedic surgeon's
armamentarium. The day of the chisel and mallet for cutting
bone has gone by The halves of the patella are now distracted
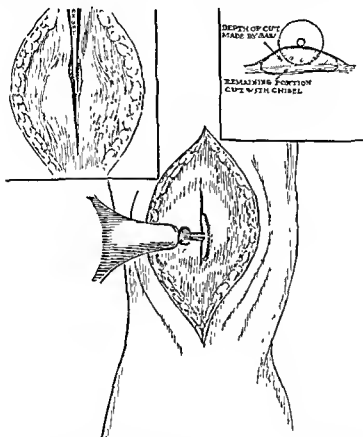
Fig. 199.—Method of approach with chisel and Albee motor saw.

as the knee is flexed The outer and inner portions of the
anatomy of the interior of the knee-joint are brought into view
by pulling in and out the halves of the patella You will see
that the whole interior of the knee is easily visualized in this
way, including the crucial ligaments. Both the inner and outer
semilunar cartilages may also be visualized by proper retraction
and the twisting in or outward of the tibia upon the femur.

formation of the joint mice shown in the x-rays (Figs. 197, 198), but as this man has been playing football for some time, there have, no doubt, been innumerable experiences which might have caused it

My technic in carrying out this approach is as follows: The patella and the lower portion of the quadriceps tendon or liga-

Fig 198 —x-Ray revealing joint mice in knee.

mentum patellæ is laid bare by a median incision about 5 inches long The ligamentum patellæ and the quadriceps tendon are split approximately in the center with a scalpel. With the Albee bone saw the patella is split about two-thirds or three-fourths of its anteroposterior diameter in the sagittal plane (Fig. 199). With a thin sharp osteotome placed in the saw-cut from below,

between the joint surfaces during function. I have operated on a considerable number of advanced cases of osteo-arthritis in which I was sure that the opposite had happened—that because of the osteo-arthritis, osteophytes had broken off, and formed joint mice.

We are now ready to close the synovia of the joint. It is very important to place the ligatures so that a very accurate approximation of the synovial membrane is brought about without the ligature material projecting into the joint space. This is accomplished by a subsynovial suture—in my practice,

Fig. 201.—Joint mice after removal.

with No. 0 chromic catgut. I wish to mention again the wisdom of using suture material of as small diameter as possible, and as little of it as possible in all bone and joint surgery. The accurate approximation of synovial membrane is necessary for several reasons; one of the principal ones is to minimize the occurrence of joint adhesions or hemorrhage into the joint.

The skin is closed with continuous suture of No. 0 plain catgut. The line of suture is freed from all blood and exudate with gauze. I am now puddling the suture holes as described in an earlier case. Next I remove the tourniquet. The value of the

mobilization The unwisdom of this has been illustrated in cases coming under my observation by a tremendous increase of kyphosis, immediately following a bilateral laminectomy, and an extensive increase in the progress of the tuberculosis It is, of course, possible to do a unilateral laminectomy before the bone-graft implantation. The sequence I have followed is, however, much to be preferred, as in certainly over 95 per cent. of cases the paraplegia will clear up following the implantation of the bone graft, and thus render laminectomy unnecessary. As the latter is a much more major operation than the implantation of a bone-graft, its avoidance is distinctly to be desired

For the technic of the above procedures reference is made to page 360 of Albee's *Orthopedic and Reconstruction Surgery*, published by W B. Saunders in 1921. (Illustrations of the technic are given on page 361 of this volume.)

In this case we have not removed the tuberculosis, but we have obtained the most complete support and immobilization possible, a condition which it is impossible to bring about by external means

I am often asked the question: "Do you recommend a bone-graft operation in cases of psoas abscess, paraplegia, or persistent sinus?" The answer is that immobilization is indicated in every instance, and in the case of a complication even more so The one contraindication is the failure to secure a clean field of operation. In other words, if there should be a secondary infected sinus unfortunate enough to come within the field of operation, this would be a contraindication Fortunately, however, the anatomic planes are such that drainage from a vertebral abscess almost always takes place outward into the loin and downward into the psoas sheath and the groin, practically never backward through the dense fascia and erector spinæ muscles to a location that would interfere with bone-graft implantation

QUESTION: "Do you use a plaster cast to immobilize immediately following the operation?"

ANSWER: I recommend *against such a procedure* because of the danger of bringing damaging pressure upon the field of

operation, especially upon the plastic flap overlying the graft. Cases have come to me, following operation elsewhere, in which a very unfortunate condition has resulted from the postoperative application of plaster-of-Paris casts, namely, a sloughing of the overlying skin and the exposure of extensive portions of the graft. However, in several instances in which this has occurred, the graft had already received its vascularization from the deeper structures and survived even this exposure to infection, granulation slowly covering it up later. It is true that if, for any reason, the overlying tissues slough without being complicated by infection, the graft may survive.

QUESTION: What is your attitude on laminectomy for all fractures of the spine?

ANSWER: As far as dislocation fracture with destruction of the spinal cord is concerned, I would like never to see another. However, I am an optimist and would prefer to give each patient the benefit of the doubt, when there is a possibility of relief, especially when we take into consideration that it is absolutely impossible, even by most expert neurologic examination, to determine whether the spinal cord has been completely destroyed, or merely pressed upon.

Illustrative of cases which have stimulated my optimism in this respect is that of a lineman who, while working upon an electric light pole, came in contact with a wire and fell, producing a fracture of his spine with immediate complete paralysis of his lower limbs. I was called several months later to see him, and found that the opinion had been given by several that the case was hopeless. Following out the dictum expressed above, I recommended that we should give the patient the benefit of the doubt, since it could not be proved that his spinal cord had been entirely destroyed. I did a laminectomy at the Mary Fletcher Hospital, University of Vermont, and found that there had been considerable comminution of the vertebræ, and that there was a large block of bone lying in the neural canal, producing compression upon the spinal cord. This block of bone was removed, and the operation resulted in complete recovery.

Case VIII. Osteomyelitis of the Arm.—This particular case of osteomyelitis does not differ from other cases of osteomyelitis and I will dismiss it with a few words The treatment of chronic osteomyelitis can be grouped under three headings: (1) Sequestrectomy; (2) saucerization, (3) dakinization To be more explicit:

Sequestrectomy must in many instances be considered as an operation of full major caliber. The old subterranean operation of curettage through the sinus must be condemned and abandoned Also the enlargement of the sinus as an approach to a sequestrum in most instances be condemned The sequestrum must be approached through an anatomic incision. The surgeon has often been misled by taking nature's cue and following a sinus. The placement of the sinus is often determined by internal pus making its way outward through the avenue of least resistance, which is usually in the origin of the nerves or blood-vessels, as illustrated by the popliteal space, Hunter's canal, and Scarpa's triangle To illustrate: the sinus associated with chronic osteomyelitis at the upper end of the femur is rarely a guide for approach to the sequestrum in that it is almost invariably anteriorly situated over Hunter's canal or Scarpa's triangle. The approach should be made through the dense fascia lata and muscles of the outer portion of the thigh

Saucerization.—A perforating sequestral hole, crater, overhanging bone shelf, etc., should never be allowed to remain after the removal of the sequestrum. The operation should be so conducted that these cavities will be transformed into valleys with sloping walls In the case of a perforating hole, this is accomplished by removal of all the bone on one side of the hole by oblique cuts to the hole from both left and right, thus leaving a valley with long, gently sloping walls The same type of plastic procedure should be carried out in the case of a crater, overhanging bone shelf, etc. The purpose of this radical procedure is to make way for the soft parts to be drawn in by the physiologic process of contraction by cicatrization Soft parts can never be drawn into a deep hole or around a sharp corner to fill a bone cavity, but nature is most potent if given a chance, in the way just explained.

Dakinization.—My practice is never to place a suture for the purpose of closing soft parts following operations for chronic osteomyelitis. The wound is allowed to remain wide open and is packed promptly with iodoform gauze. The latter is used because of its germicidal properties, its tolerance to the tissues, its usefulness as a hemostatic agent, and the ease of removal. The outside dressings are removed at the end of twenty-four hours; at this time the iodoform gauze is merely started around the edge and moistened with saline. It is later entirely removed in stages, consuming from two to four days. Dakin tubes are then inserted, the wound lightly packed with gauze, and instilled every two hours with Dakin solution, prepared either from hyclorite or zonite. I have found either of these two preparations more dependable than the Dakin solution ordinarily prepared in the apothecary shop or average hospital. As they are prepared by electrochemical methods, the chlorin remains longer.

NEUROLOGICAL INSTITUTE, DEPARTMENT OF
NEUROLOGICAL SURGERY

CLINIC OF DR. BYRON STOOKEY

FOUR EXTRAMEDULLARY TUMORS OF THE SPINAL CORD, WITH REMOVAL

Multiple Neurofibromatosis with Signs of Spinal Cord Compression. Presentation of a Case and Operation. Spinal Cord Compression Symptoms Relieved by Removal of Four Intradural Tumors. Discussion of History, Physical Findings, and Differential Diagnosis.

History.—Mrs. C. H., New York Neurological Institute, No. 27,572, age thirty years; born in Poland; occupation housewife; married; admitted to the Neurological Institute October 8, 1924.

Chief Complaint.—Unable to walk; weakness of legs, pains in arms, and difficulty in passing urine.

Onset of First Symptom.—During the summer of 1923.

Character of First Symptom.—Gradual loss of power in lower extremities.

Course.—Progressive, without remissions

Present History.—Prior to October, 1923 patient was enjoying excellent health. About this date noticed heaviness of left leg; this was first noticed on going upstairs. The leg felt as if a weight were attached to her foot. This was not marked at the beginning. Some time later she noticed a peculiar feeling in her left leg; it felt as if her foot and leg were "asleep"—sort of pins-and-needle sensation. This was noticed more in the foot than in the leg. These symptoms referable to left leg slowly and progressively grew worse, the tingling and pins-and-needle sensation going up the left side of body. In December, 1923 she noticed weakness in the left hand and arm. The grip of left hand was decidedly decreased, so that occasionally

things were dropped. This weakness was followed in a short time by a sensation of pins and needles similar to that felt in her legs. There was not much change in the symptoms other than a slowly progressive weakness on the left side until January, 1924, when she began to have pains in her left arm and leg. These pains seemed to be deep seated, constant, and aggravated by lying down. Coughing, sneezing, or straining at stool did not increase the pains or the pins-and-needle sensation

February 24, 1924 her little girl died, and it was shortly after this that she noticed a tingling sensation in the right leg. At the same time she noticed a weakness of the right leg. It was exceedingly difficult for her to walk, for the left leg by this time was very weak. About April, 1924 she started to have pain in her right leg, similar to the pain she had had in the left leg, only not so severe Several weeks after the onset of the pain the tingling sensation and weakness involved the right hand and arm. There was no further change in symptoms until July, 1924, when she noticed it was difficult for her to pass her urine, particularly to begin urination. After the flow of urine would start it would very suddenly stop. She had no control over this at all. It would stop two or three times during the act of urination. Patient states she was never incontinent of urine. Some time after July she noticed she was very badly constipated and had to take large doses of cathartics in order to move her bowels

Her symptoms of weakness grew rapidly worse until she was unable to walk at all. She became bedridden and has been unable to move her legs from the bed Since September, 1924 she has been unable to move her arms but very little and only then with great difficulty

Patient states no one in her family has had any similar complaint.

Past History.—She has had no injuries or accidents, and has had no illnesses of any kind. She has had 4 children, 3 of whom are living. The third child died of pneumonia in 1924. No miscarriages.

Personal History.—She drinks tea and coffee moderately,

and is moderate in the use of alcohol. She sleeps normally. Her appetite is good. She is markedly constipated. Her menstrual periods are regular.

Family History.—Her father is dead—cause unknown. Her mother died at fifty-five—cause unknown One brother, forty, dead—cause unknown. Sister living, thirty-eight, apparently in good health. Husband living and well. Patient has had 4 children, three of whom are living. The third child died of pneumonia in 1924. No miscarriages. No similar condition in family history as far as the patient knows.

EXAMINATION

Abnormal Attitudes and Deformities.—The patient is bedridden and unable to stand Both hands are held in somewhat claw position. The palms are soft and there is no evidence of any definite contracture

Gait.—Unable to test gait because patient is unable to walk.

Co-ordination.—*Equilibratory.*—Unable to test.

Non-equilibratory.—Considerable ataxia and dysmetria on finger to nose, finger to finger, and thumb to each finger. The movements were slow, apparently due to some motor defect. and failure of motor execution. Toe to object above patient unable to perform due to paralysis in both lower extremities. Adiadokokinesis present on both the left and right upper extremities.

Skilled Acts.—Patient's speech is normal. Her handwriting is markedly interfered with due to motor defect in the use of her right hand.

Abnormal Involuntary Movements.—No tremors or fibrillary twitchings are noted

Muscle Strength.—Marked weakness of both lower extremities. Patient is barely able to raise either extremity off the bed. There is a marked weakness of both upper extremities, especially in the flexors and extensors of the wrist and fingers.

Muscle Status.—No atrophy or hypertrophy. Hypertonicity of both upper extremities—left more marked than the right. Hypertonicity of both lower extremities.

Reflexes:

Deep.			Left	Right
Pectoral	..	.	0	0
Biceps	. .	.	0	0
Triceps	.	..	0	1 (with spread to the biceps)
Radial	. . . .	..	+0	1+
Ulnar	. . . .		0	1+

(On tapping the ulna on both sides there was a spread to the flexors of the fingers, but this spread did not include the fifth finger of either hand)

Suprapatellar	. . .		Clonus	Clonus
Patellar	. . .	. .	Transient clonus	Transient clonus
Hamstrings	.		3+	3+
Tibio-adductor crossed and uncrossed			p	p
Achilles	. . . .		2+	1—

Superficial.				
Upper lateral abdomen	.	. .	o	o
Lower lateral abdomen		.	o	o
Plantar flexion	.		o	o
Babinski		.	p	p
Chaddock	.	. .	p	p

General Sensory Examination (Figs 202, 203).—*Touch Acuity*—Moderately diminished below the fourth cervical dermatome. Pain is lost below the second thoracic and diminished in first thoracic and eighth cervical dermatomes, with less diminution in fifth, sixth, and seventh cervical dermatomes, the level being at the fourth cervical.

Temperature—Shows essentially the same disturbance as that of pain.

Vibratory and Muscle, Joint and Tendon Sense.—Lost below the costal border on both sides, is also lost in the left hand and diminished in the right hand and arm. The patient's answers do not seem to be very reliable. Muscle, joint, and tendon sense is lost in the right toes and diminished in the left toes It is also markedly diminished in the left hand and to a less extent in the right hand, in the fourth and fifth fingers, the greatest disturbance in joint and tendon sense being in the toes.

Cranial Nerves.—None of these show any deviation from the normal

Systemic Examination.—Essentially negative, except for the nodular masses felt along the course of the nerves of the upper extremities on both sides and a few nodular masses, freely movable, immediately beneath the skin, over the chest, and the
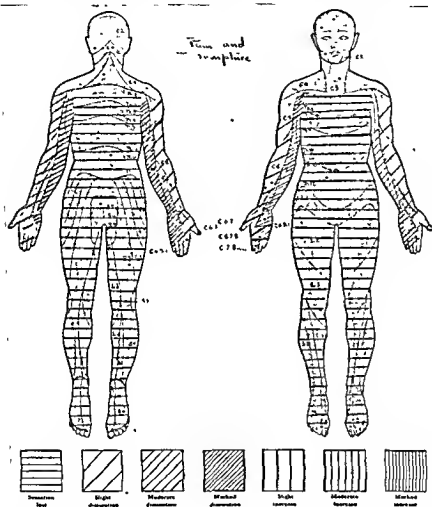
Fig 202 —Chart showing pain and temperature sensation Complete algesia up to the second thoracic dermatome. Marked hypalgesia in the second and first thoracic dermatomes and a moderate hypalgesia in the eighth, seventh, sixth, and fifth cervical dermatomes Sensory level for pain and temperature fourth and fifth cervical segments

abdomen. The masses seem discrete, the average size being approximately 0.5 by 1 cm. These are not tender and seem to be associated with the nerves, both cutaneous and deep.

Reflexes:

Deep		Left	Right
Pectoral		0	0
Biceps	.	0	0
Triceps	.	0	1 (with spread to the biceps)
Radial		+0	1+
Ulnar	.	1+	1+

(On tapping the ulna on both sides there was a spread to the flexors of the fingers, but this spread did not include the fifth finger of either hand)

Suprapatellar		Clonus	Clonus
Patellar	... ..	Transient clonus	Transient clonus
Hamstrings		3+	3+
Tibio adductor crossed and uncrossed		p	p
Achilles	,	2+	1—

Superficial.			
Upper lateral abdomen	.	o	o
Lower lateral abdomen		o	o
Plantar flexion		o	o
Babinski	.	p	p
Chaddock	.	p	p

General Sensory Examination (Figs 202, 203) —_Touch Acuity_—Moderately diminished below the fourth cervical dermatome. Pain is lost below the second thoracic and diminished in first thoracic and eighth cervical dermatomes, with less diminution in sixth, and seventh cervical dermatomes, the level being at the fourth cervical.

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Vibratory and Muscle, Joint and Tendon Sense—Lost below the costal border on both sides; is also lost in the left hand and diminished in the right hand and arm The patient's answers do not seem to be very reliable. Muscle, joint, and tendon sense is lost in the right toes and diminished in the left toes. It is also markedly diminished in the left hand and to a less extent in the right hand, in the fourth and fifth, fingers; the greatest disturbance in joint and tendon sense being in the toes.

Cranial Nerves.—None of these show any deviation from the normal

The blood examination shows:

Wassermann	. . ... Negative
Hgb.	. . 75 per cent.
Color index....	. 0.89
R. B. C.	. 4,200,000 per cubic millimeter
W. B. C........	7000 " " "
Neutrophils............. ..	. . . 68 per cent
Lymphocytes.	28 "
Eosinophils....	2 "
Basophils............	2 "
Urea	35.5 mg
Urea nitrogen	16.6 mg.
Sugar	5.038 per cent.

The spinal fluid shows Wassermann negative; xanthochromia; no coagulation; no cells, globulin 3 plus.

The manometric study of the cerebrospinal fluid shows evidence of complete subarachnoid block, as indicated in chart (Fig. 205).

Urine essentially negative.

OPERATIVE REPORT

Operation No 1593
Preoperative Diagnosis:
Multiple neurofibromatosis, with com-
pression of the cord at cervical 5, 6,
and 7 segments.

Operation 10/22/24
Postoperative Diagnosis:
Multiple neurofibromatosis, 4 tumors,
2 on the left and 2 on the right,
opposite cervical 4, 5, 6, and 7 seg-
ments.

Arches Removed.—Cervical 4, 5, 6.

Vertebral Column.—Angulation: None.

Changes in bony structure: None, except that the arches were unusually thin.

Dura.—Through the dura the cord could be seen immediately beneath, showing one large vein upon the cord and numerous small arteries between the larger vessels. Apparently there was no fluid between the dura and the cord. Palpation of the cord and dura before opening the dura gave no evidence of a tumor. Respiratory oscillations of the dura were not present. Lying on the left side of the cord, apparently in the position of the

fifth or sixth cervical root, an extradural neurofibroma, approxi
mately 2 by 1 cm, was seen Bone was rongeured away and the
tumor freed distally as far as possible, but its distal end was
undetermined It was apparent that the tumor extended within
the dura—probably dumbbell shaped, having part extradural and
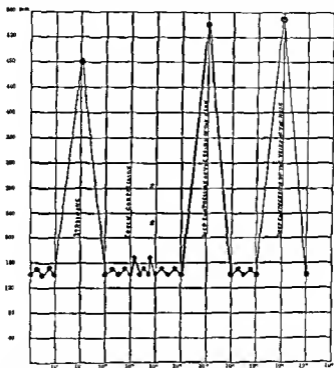part intradural, such as are often seen in tumors which arise

Fig 204—Manometric chart of cerebrospinal fluid showing normal
response to straining, touch compression, and deep compression of the veins
of the neck. On straining and on compression of the veins of the neck a
prompt rise of 300 to 400 mm. takes place

from the nerve roots. The dura was then opened without
opening the arachnoid, the cord being pushed back dorsally
against the dura. The cord was normal in color and had one
or two large veins and a similar number of blood-vessels upon it.
On opening the arachnoid no fluid escaped.

Tumor.—Lying beneath the nerve roots on the left side two

discreet and sharply circumscribed tumors were seen. These appeared to be in front of the dentate ligament. Two dentate ligaments were cut and used to rotate the cord so that the cord would not be injured during the operative procedure coincident with removal. Both tumors were removed without damage to the cord. They were relatively hard, non-vascular, and typical
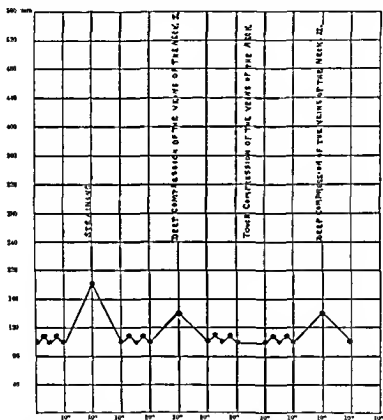

Fig. 205 —Manometric chart of cerebrospinal fluid showing subarachnoid block. The normal prompt rise on straining and on compression of the veins of the neck is barely present. The fluid rose only 80 mm. on straining and 40 mm. on compression of the veins of the neck. Compare with Fig. 204.

neurofibromata. A probe was inserted up and down beside the cord on the left side without meeting with any resistance on either its ventral or dorsal sides. The right side of the cord was then investigated, and two additional tumors were seen lying in the same relative position as those on the left side. The dentate ligaments on the right side were also cut so as to

rotate the cord, and the two tumors on the right side were likewise removed. The tumors were all dumbbell shaped and protruded through the dura, extending out on to the nerve root a short distance The cord as a whole was pushed dorsally and sharply angulated. Apparently the tumors and the cord had completely obliterated the subarachnoid space, as had been indicated by the manometric tests.

Cerebrospinal Fluid.—On opening the dura and arachnoid no fluid was seen The cord did not pulsate. After removal of

Fig. 206 —Dura is exposed and extradural neurofibroma, probably on the left fifth cervical root, is shown The spinal cord is pushed back against the dura and can be seen through the dura.

the tumors the cord pulsated and fluid was seen to come from above. The veins of the neck were compressed and fluid welled up in the wound, thus indicating that probably the free subarachnoid space above the operative field was not shut off. This is a very valuable procedure in determining whether you are above or below the suspected spinal cord tumor. I first saw it used by Dr. Mixter, of Boston, and have since found it very valuable during an operation, to determine the presence of a block above the site of the operation.

It is perhaps problematic how much value was gained by this operation, in view of the fact that we knew there were a great many tumors present throughout the nervous system of this patient. However, we had no means of knowing whether or not more than one tumor existed within the vertebral canal

Fig. 207.—The dura is open, showing four intradural tumors lying ventro-lateral to the spinal cord. T, Tumor. Tumor on left dumbbell shape, lying in part intradural and in part extradural; N.R., nerve root running through the tumor and probably a part of the tumor; C, spinal cord pushed backward; D, dura.

causing compression of the cord, and consequently we feel that an exploratory laminectomy was justified. It is possible that by this operation we may have added a few years to the patient's life and rendered these years more comfortable for her than they otherwise would have been.

Closure.—The wound was then closed, the dura with continuous silk and the superfine structures with catgut and chromic gut and the skin with silk. In order to immobilize the neck a Thomas collar was applied, this being used in this clinic instead of a large plaster for the head and neck, or the usual board from the occiput to the dorsal spine. The Thomas collar is very much more comfortable and the immobilization obtained is more efficient than with any other type of apparatus.

Postoperative Follow-up.—The wound healed by first intention and stitches were removed on the tenth day. The

Fig 208 —Two dentate ligaments have been cut and one of them used to rotate the cord in order to expose the tumors on the left ventrolateral surface of the cord

patient gradually regained the use of her legs, so that she now can walk, but she still is unsteady on her feet and has more difficulty with her left leg than she has with her right. The use of her hands is still restricted, as is to be expected, since removal of the tumor necessitated cutting one or two of the ventral nerve roots. At the present time she is able to get about on her feet and has control of her bladder and rectum. We shall give her deep x-ray therapy, with the hope of arresting further growth of additional tumors within the spinal canal.

Comment.—It is oftentimes interesting to attempt to make a diagnosis on the history alone, or on the physical findings alone. If the diagnosis can be made independently on the history or on the neurologic examination, one may feel more certain than if the two together are needed to establish the diagnosis. I do not mean that we would in any case be content
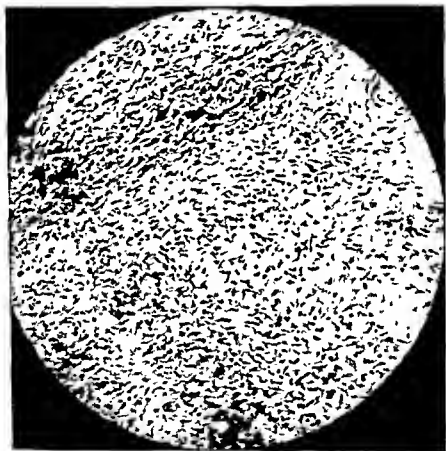
Fig. 209.—Neurofibroma with relatively few cells (Microphotograph, × 100)

to come to a final conclusion on either the history or the physical findings when both are available What I do mean is that the more typical forms of certain diseases have both a very characteristic story as well as very characteristic signs. In reading the history of this patient one cannot help but suspect the presence of compression of the spinal cord. The gradual

onset, the progressive character, and the sequence of the symptoms all point toward spinal cord compression. This patient first noticed heaviness of the left leg, only slight at first, which gradually became more marked, followed by dysaesthesia of the left leg. Both of these symptoms have been progressive and were followed by a similar train of symptoms in the left upper extremity. She next noticed an involvement of her right leg and finally of her right arm. This is the usual sequence of events found in spinal cord tumors causing compression of the spinal cord. It is interesting to note that until January, 1924 she did not have any pain. In her story pain has been rather trivial and not an outstanding feature. We are all aware that pain is a common symptom in spinal cord tumors, but that many spinal cord tumors may pass through their entire clinical course without the presence of pain, so that pain is not a necessary symptom for the diagnosis of spinal cord tumor. We notice that she has had difficulty in passing her urine. Dysuria is a relatively common symptom in spinal cord tumors, generally occurring rather late in the disease. In this patient this symptom did not appear until a few months before operation. Possibly one of the reasons why bladder and rectal symptoms do not occur until late is due to the fact that the visceral afferent pathway lies next to the central gray. It is a short multineurone pathway and consequently less apt to disturbance by pressure than a long pathway of one or two neurons such as the pyramidal tract or the dorsal sensory columns. Probably the visceral afferent pathway is of greater antiquity than some of the somatic afferent pathways, since we know in general that fiber tracts lying more upon the periphery of the cord are of more recent acquisition than those more centrally placed.

From the history, then, we would suspect some compression of the spinal cord, the upper level of which would be somewhere in the vicinity of the segments controlling the musculature of the hand, since the patient complains of weakness in her grip and a tendency to drop things from her hand.

From the physical examination we find a definite sensory level pointing to the fourth to fifth cervical segments, and

motor disturbances likewise indicative of involvement of the spinal cord up to this level   There is an absence of the pectoral, biceps and triceps, radial and ulnar reflexes on the left, with a marked diminution of those on the right, which would tend to place the lesion in the vicinity of the fifth to eighth cervical segments, with evidence of pyramidal tract involvement below this level, as evidenced by a superpatellar clonus, increased knee-jerks, the presence of tibio adductor reflexes, a Babinski and a Chaddock, as well as the absence of the abdominal reflexes. It is very interesting to note that the Achilles reflex is not increased, but, in fact, diminished on the right side. This seems rather difficult to explain in the presence of a superpatellar clonus, a transient patellar clonus, and a Babinski reflex. To this I will refer again

The examination shows the presence of a few small masses in the skin over the abdomen, and also a few nodules along the course of the nerves of the upper extremities on both sides   These are freely movable, discrete, and non-painful. From their distribution and character we feel that they are neurofibromas, and the case, therefore, one of neurofibromatosis, such as described originally by Recklinghausen. We know that neurofibromatosis may be a very diffuse process, with multiple tumors scattered throughout the peripheral nervous system, involving the cranial as well as the spinal nerves. They may involve the cranial nerves within the cranial cavity, and the spinal nerves within the vertebral canal. When they involve the spinal nerves within the vertebral canal they may give rise to spinal cord compression. This I believe is the case in this patient. We are dealing here with a general neurofibromatosis, with neurofibromas of the fifth and sixth and seventh cervical nerves within the vertebral canal, giving rise to compression of the spinal cord, and also tumors scattered over the surface of the body, particularly along the course of the nerves of both upper extremities, and along the cutaneous nerves in the region of the abdomen. It is possible that we may account for the diminished ankle-jerk by the presence of a neurofibroma of the sciatic nerve, though we have been unable to palpate any tumor on the sciatic. I have

seen one patient with a neurofibromatosis who had a large
tumor of the sciatic nerve, as well as a tumor compressing the
spinal cord   I feel quite sure that the tumors within the ver-
tebral canal compress the spinal cord have caused a com-
plete subarachnoid block, because of the presence of a positive
manometric finding in the cerebrospinal fluid. A manometric
study of the cerebrospinal fluid should be done in every case of
suspected spinal cord compression   The procedure is very
simple. A water manometer is attached to the lumbar needle
and a lumbar puncture made. Various tests are then performed,
such as having the patient strain and compressing the veins of
the neck   On straining and on compression of the veins of the
neck in a normal individual the pressure of the cerebrospinal
fluid shows a very marked and immediate rise, and on release
of the straining and compression of the veins an immediate
and prompt fall. However, when there is an obstruction of the
subarachnoid space the free circulation of the cerebrospinal fluid
is interfered with and a prompt rise on straining or on com-
pression of the veins of the neck does not take place. There
are finer details to this test, of which we cannot take the time
here to discuss   I know of no test of greater importance than
a thorough manometric study of the cerebrospinal fluid in any
case of suspected spinal cord neoplasm

You may question the value of a laminectomy in this patient
because of the multiplicity of tumors   However, if we can
relieve the compression of the cord this patient may have added
to her life expectancy a number of years of usefulness, and
instead of being as she now is, a bed patient, helpless and unable
to use her hands, she may be able to walk and to feed and clothe
herself   Furthermore, instead of going on to become incon-
tinent, a return of bladder function may be expected. It is well
known that neurofibromatosis is a very slowly progressive dis-
ease, and its duration may be very long. Not infrequently the
presence of neurofibromatosis is discovered at death when there
have been very few symptoms present during life, so that if we
can relieve a compression of the spinal cord, which is the main
problem which confronts us in this patient, we have a right to
expect to give her a number of years of relief.

CHOLECYSTECTOMY WITHOUT DRAINAGE WITH SPECIAL REFERENCE TO THE COVERING OF THE CYSTIC DUCT STUMP WITH A PERITONEAL FLAP

CHOLECYSTECTOMY without drainage has been advocated from time to time in the past twenty years by various surgeons, notably by Witzel, Haberer, Willis, Richter, and, in a modified way, by the Mayos. In the development of the technic mishaps have unquestionably been encountered and many surgeons have been deterred from attempting cholecystectomy without drainage, either because of a personal unfortunate experience or because of complications or accidents which have been called to their attention through reports in the literature.

The main danger which threatens the patient whose gallbladder has been removed and whose wound has been closed without some sort of drainage is a separation of the ligature from the cystic duct stump. This ligature may absorb too soon, or it may cut through the stump, or it may be exploded from the stump, due to back pressure from the biliary system. Should such a leakage from the cystic duct occur, a biliary peritonitis will result. This is certainly a serious though not necessarily a fatal complication and usually requires prompt interference, with reopening of the wound, cleansing of the peritoneal cavity, and provision for ample drainage. Bile leakage may also occur from the liver bed of the gall-bladder if the gall-bladder has not been removed subperitoneally and if even a small bile-duct has been exposed. This leakage from the liver bed of the gallbladder is usually not so profuse as from the cystic duct stump, but may be sufficient to cause considerable trouble if a larger hile radical opens into the liver bed. For these reasons cholecystectomy without drainage has been opposed by many surgeons.

The obvious advantages which would accrue from closing an abdominal wound after removal of the gall-bladder without drainage are as follows:

1. Fewer postoperative peritoneal adhesions
2. Less danger of postoperative ventral hernia.
3. Simpler conditions if necessity for reoperation arises.
4. Simplified after-treatment, and much more rapid convalescence. In many instances the patient can be out of bed eight or ten days after operation.
5. Less discomfort to the patient and no painful removal of drains
6. Less danger of bile leakage. This occurs with remarkable frequency when the cystic duct stump region is drained. The tendency to leakage is undoubtedly increased by the pressure of the drain which runs to the cystic duct stump and prevents peritoneal agglutination to cover the stump Such leakage, even with drainage, often causes serious disturbance to the patient from the local peritonitis produced by the irritation of the bile, rise of temperature, hiccup, vomiting, postoperative dilatation of the stomach, etc
7. Avoidance of mechanical interference with gastric function from pressure of drains on the duodenum with partial or complete duodenal obstruction I have seen this complication occur in 2 cases where immediate relief followed removal of the drain
8. Avoidance of persistent sinus formation.
9 Avoidance of reaction from drain removal, such as rise of temperature, pulmonary infarct, etc. A temperature reaction is very common I have seen 1 case of pulmonary infarct apparently the direct sequel of removing a drain.
10 Avoidance of retention after drain removal This is not an uncommon occurrence and the retention is frequently very difficult to locate. I have seen 2 cases in which reoperation was necessary to open large subhepatic accumulations, and at least 3 others in which after patient and protracted observation these retentions opened and emptied spontaneously. This retention can occur in spite of delayed drain removal and care-

ful replacement of a wick, rubber-dam strip, or tube into the sinus.

Recognizing these advantages, and as the indications for cholecystectomy have been so extended that today removal of the gall-bladder is the operation of choice in the majority of cases of gall-bladder disease, an attempt has been made to
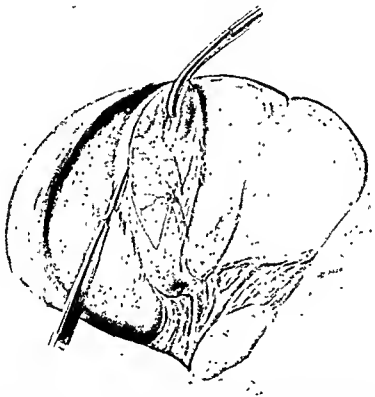
Fig. 210 —Fundus of gall-bladder grasped by Carmalt clamp   Making of peritoneal incision with formation of triangular peritoneal flap above ampulla.

develop a technic to make the operation of cholecystectomy without drainage as safe as possible. The method which I am about to demonstrate to you is the result of this effort. Although this special technic may not always be necessary, I believe that it is safer by far to attempt it wherever feasible. I believe also that the subperitoneal method advocated produces much less bleeding from the liver bed than when liver tissue is entered

and is also less likely to result in bile leakage from the liver
bed through opening of bile radicals Further, I feel that as
far as possible the technic should be used to prevent leakage
from the cystic duct stump and liver bed, oozing from the liver
bed, and adhesions, even where a drain is inserted The one
slight objection that I can find to the technic is that it may re-
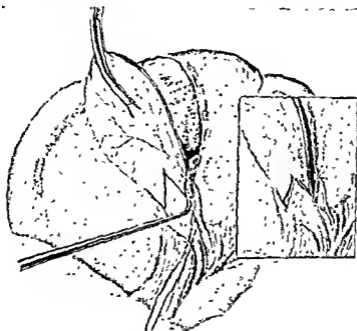
Fig 211 —Gall-bladder separated subperitoneally from liver bed, and
aneurysm needle passing under cystic vessels Insert shows cystic vessels
ligated and divided and some separation of triangular flap

quire a trifle more time for its execution than the usual pro-
cedure The method is as follows.

A cholecystectomy from the fundus toward the cystic duct,
or from above downward, is recommended as more logical,
safer, as regards the avoidance of injury to the hepatic and
common bile-ducts, and as giving better exposure. It also gives
the operator a better hold on the gall-bladder and better traction
on the deeper portions of the ducts, when these regions are ex-

amined and manipulated. The right lobe of the liver is first dislocated forward and upward as far as possible to expose its under surface and tampons are placed to wall off the operative field properly. The gall-bladder is not aspirated unless it is very tensely distended. The fundus is grasped with a Carmalt clamp, and with a sharp knife the peritoneal surface is divided down to the muscularis about $\frac{1}{4}$ inch from the junction of the
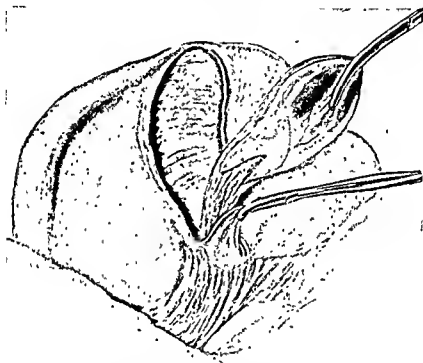
Fig 212 —Gall-bladder almost completely separated from liver bed and triangular flap separated from ampulla and upper part of cystic duct.

liver and the gall-bladder. This incision is carried around from the fundus toward the ampulla both on the right and left side, and above the ampulla the two incisions are joined by two others in such a manner as to make a triangulr flap (Fig. 210).

The gall-bladder is next bluntly separated subperitoneally from its bed in the liver until the cystic vessels are reached. The cystic vessels are then exposed, an aneurysm needle is slipped beneath them, and they are ligated and divided (Fig. 211).

The triangular peritoneal flap is now grasped with a Mikulicz forceps (Fig. 212) The usual palpation of the hepatic ducts and the common bile-duct down to the papilla is practised to be sure that they are free from calculi. Any calculi in the cystic duct should, if possible, be milked upward into the gall-bladder, or, at least, into the upper portion of the duct. The cystic duct is then ligated with No 2 chromic catgut close, but not too close,

Fig 213 —Cystic duct ligated, triangular peritoneal flap pulled forward, gall-bladder clamped with pedicle clamp at cystic duct junction, and cholecystectomy being done by cautery

to its point of junction with the common bile-duct, the triangular flap being pulled forward so as to make a funnel-shaped cavity The gall-bladder is clamped with a pedicle clamp at the cystic duct junction and the cholecystectomy is done by means of a cautery (Fig 213). Occasionally a second ligature is passed around the cystic duct in order to make more certain that a separation of the ligature is not possible After the removal of the gall-bladder and thorough cauterization of the cystic

duct stump, especially of the mucous membrane, the triangular flap is brought back toward the liver bed and we are now ready to cover the stump of the cystic duct and close the liver bed of the gall-bladder from below upward (Fig. 214). A continuous catgut suture with a curved needle is used. The suture is passed first through the right peritoneal flap, emerging just proximal to the edge of the flap. It then
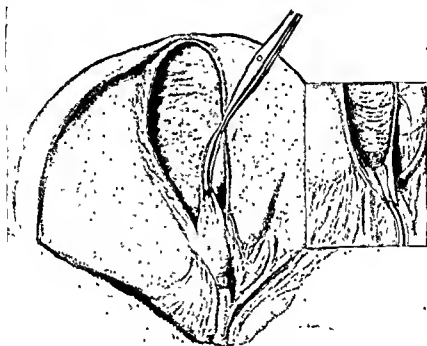
Fig. 214.—Triangular peritoneal flap pushed back into place with ligated cystic duct stump showing through peritoneum. Lateral peritoneal flaps and ligated cystic vessels in left flap also shown Insert shows ligated cystic duct stump at bottom of funnel

enters the triangular flap, catches the bed of the liver superficially, and passes to the left peritoneal flap, entering just beyond the edge of the flap (Fig. 215). This suture is tied and is then run from right to left in a similar fashion except that the triangular flap is ignored as the suture passes from one side to the other, the suture merely catching the superficial layers of the liver bed (Fig. 216). After the completion of the suture to the

The triangular peritoneal flap is now grasped with a Mikulicz forceps (Fig 212). The usual palpation of the hepatic ducts and the common bile-duct down to the papilla is practised to be sure that they are free from calculi Any calculi in the cystic duct should, if possible, be milked upward into the gall-bladder, or, at least, into the upper portion of the duct. The cystic duct is then ligated with No 2 chromic catgut close, but not too close,
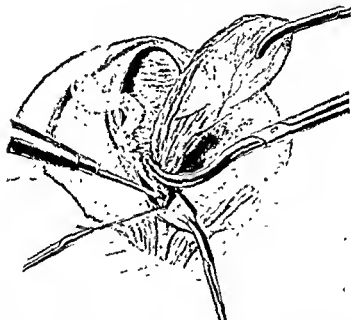

Fig 213 —Cystic duct ligated, triangular peritoneal flap pulled forward, gall-bladder clamped with pedicle clamp at cystic duct junction, and chole-cystectomy being done by cautery

to its point of junction with the common bile-duct, the triangular flap being pulled forward so as to make a funnel-shaped cavity. The gall-bladder is clamped with a pedicle clamp at the cystic duct junction and the cholecystectomy is done by means of a cautery (Fig. 213). Occasionally a second ligature is passed around the cystic duct in order to make more certain that a separation of the ligature is not possible After the removal of the gall-bladder and thorough cauterization of the cystic

the same number of cases which in my opinion required a cigarette drain or a cigarette drain and gauze tamponade. These figures give an approximate idea, in a relatively small group, of the proportion of cases that may safely be closed without drainage to those which require drainage. Certain cases can be closed with absolute safety, in some closure without drainage may be questionable, but possible, but in others drainage is imperative. The definite indications for drainage are severe
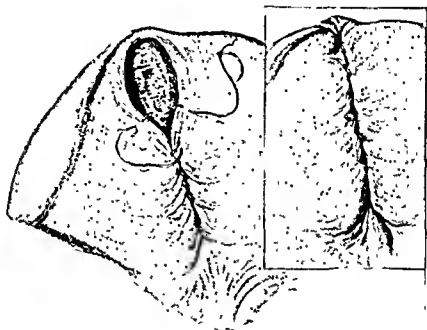
Fig. 216 —Continuation of suture. Insert shows suture completed, with liver bed of gall-bladder entirely closed and cystic duct stump covered.

infection, marked oozing from the liver bed, a friable cystic duct, imperfect or unsatisfactory ligation of the cystic duct stump, and choledochotomy. Incidentally, I might mention that there has been a tendency in recent years toward dispensing with the more elaborate drainage of the biliary system after choledochotomy and toward suture of the opening in the common bile-duct, unless one is confronted with a definite cholangitic infection in either the larger or smaller bile-ducts.

1 One should know whether the pneumonia which preceded
the empyema has cleared up Adding a pneumothorax, though
it be only partial, to a diseased lung, is apt to make the patient
worse and to seriously embarrass his circulation In such a case
one would better wait until the pneumonia has subsided How
can one know whether the pneumonia under the fluid has cleared
up? Sometimes by the fact that the temperature has been
normal for a day or several days prior to the secondary rise
indicating the development of empyema Sometimes by the
*cessation of cough and expectoration and the improvement in
the patient's general condition* Sometimes by the length of
time since the onset of pneumonia, although this is never an
absolutely safe guide. We do know, however, that a pneumo-
coccus pneumonia usually runs a course of from five to nine
days, and that a streptococcus pneumonia may last much longer
and affect one portion of the lung after another This leads to
the consideration of the second important point

2. *One should know which organism was responsible for the
pneumonia*, for the same one is likely to be the cause of the
empyema, although not always so. If the former is not known,
the organism responsible for the empyema should be deter-
mined by smear and culture. It is known that pneumococcus
fluid is likely to form thick pus at an early date, is likely to form
adhesions between the two pleural layers earlier, and is likely
to be smaller in amount, especially when the empyema has fol-
lowed a lobar pneumonia, than streptococcus fluid Strepto-
coccus fluid, on the other hand, may be poured out early in the
disease in large quantity, it may be clear for days though loaded
with bacteria, it may fill the entire pleural cavity, or be bilateral
in position, adhesions between the pleural layers usually form
late, and the pus becomes thick at a later date The treatment
of two such *different conditions manifestly should not be the
same*. In the former case we have a smaller, walled-off cavity
containing pus, with normal or fairly normal lung underlying
it. Evacuation of this pus will bring relief to the patient In
the second case we have an extensive thin septic exudate, per-
haps filling the entire pleural cavity, *without adhesions or only*

a few, and with perhaps a lung underlying this fluid which still shows various areas of bronchopneumonia. How should this be treated?

Opening the chest wide will, of course, evacuate the septic fluid, but that is all The place of the fluid is at once taken by air, and the acute pneumothorax, added to the diseased lung and already overburdened heart, may increase the strain to such a degree that the patient succumbs By temporizing for a while, removing the septic fluid by aspiration or by one of the closed methods of drainage, one gets all the advantages of an operation without its disadvantages The most critical part of the illness may thus be bridged over until the patient is in a condition to stand an operation. Such methods of treatment can only be carried out, however, if the patient has been studied carefully.

3. One should know the condition of the opposite lung. In case the patient has had a secondary pneumonia, one which has followed upon or complicated some other acute infectious disease, it is more likely to have been a bronchopneumonia, and more likely to have been bilateral in character. A focus may still be present on the supposed normal side and this focus may be seriously influenced by an operation. Unless there is great urgency, it is better to delay until the opposite side has entirely cleared up.

An exploratory puncture should always be done, the fluid sent to the laboratory, and, except in urgent cases, the results of examination awaited. With proper technic such a puncture can be done painlessly. If able to, patients should sit up, supported in front by a nurse, or by several pillows Otherwise, they may lie on the abdomen or on the affected side near the edge of the bed. With a very fine caliber needle and a small syringe, a wheal is first made in the skin, about the size of a dime, by injecting $\frac{1}{2}$ per cent. novocain solution. This intradermal injection renders subsequent punctures painless. The needle, or one of somewhat larger caliber and longer, is now plunged directly into the intercostal tissue where the exploration is to be done, usually the eighth or ninth intercostal space.

A few cubic centimeters of the same solution are deposited here
and the injection continued while the needle is being with-
drawn. Before inserting the needle of the aspirating syringe it
should be attached to the syringe and tested to determine its
patency and proper fitting The piston should be pushed down
and the needle then inserted. As soon as one feels that the
pleural cavity has been entered, one should stop in order to
avoid injuring the lung, and then slowly fill the syringe. So
soon as accomplished the piston should be steadied to avoid
injecting pus along the puncture canal, and the needle quickly
withdrawn A small dressing completes the performance.

I shall now show you several patients and discuss with you
the important points relating to each case Before doing so,
however, let me emphasize once more not to treat all acute
empyema patients alike, but to individualize, and in each case
choose that form of treatment, carried out at such time and in
such manner, as will most likely lead to a cure

Case I. Typical Extensive—So-called Complete—Empyema of Streptococcus Origin.

—Miss M. R , twenty-six years old, was
admitted to the hospital sixteen days *after the onset of an acute
pulmonary disease which was probably a bronchopneumonia.*
No details of the acute disease were available. *This had been
followed by excessive cough and later by reddish-brown ex-
pectoration.* It had begun with chilly and grippy feelings and
she had vomited for three days On examination, we found a
very sick looking but well-nourished young woman, with a
temperature of 104° F., rapid respiration, and rapid pulse.
Examination showed almost *complete immobility of the left
chest.* There was *absolute flatness over the front and back as
far up as the clavicle.* Over this area there was *absence of
fremitus.* The *heart was considerably displaced to the right.*
The patient was quite dyspneic. *The blood examination showed
16,400 white cells with 80 per cent. polys.*

We were apparently, then, dealing with an extensive exudate
in the left chest as evidenced *by flatness, displacement of the
heart, and absence of fremitus.* The high fever, high blood-

count, and a history of having followed an acute pulmonary condition, made it seem most likely that the fluid was pus   In order to determine the character of this exudate, an exploratory puncture was done in the eighth intercostal space and thin greenish pus withdrawn, which was sent to the laboratory for culture.

We were dealing with an acute empyema. What, then, should be the further procedure? If, in such a case, one simply goes ahead and resects a rib to establish good drainage, one may endanger the life of the patient. It is for this reason that careful study of this subject has been made   It has been found that when there is an extensive or complete empyema, and the heart has been considerably displaced, a sudden evacuation of fluid may produce an acute pneumothorax with its serious consequences. In such an extensive exudate of thin pus, and with gross cardiac displacement, it is better to evacuate the fluid slowly, without allowing air to enter, thus permitting the lung to expand gradually and the mediastinum to assume its normal position.

Owing to the fact that this patient had much dyspnea it was deemed wise to give relief early, regardless of the condition of the lungs. Nevertheless, we awaited the result of the culture, which showed hemolytic streptococcus. On the second day after admission a trocar drainage operation was performed   This is done by having the patient lie on the abdomen, or as nearly so as is compatible with his comfort. The eighth intercostal space is then infiltrated with ½ per cent. novocain, the aspirating syringe introduced to make sure that the proper place has been reached, and a good sized straight trocar then inserted. As soon as pus flows, a rubber tube of a size that will easily slip in the trocar is inserted and the latter withdrawn. The tube should have an end and a lateral opening and enter the cavity far enough to have the openings just within the thorax   The tube is then clamped, fastened to the chest wall, and the patient returned to bed.

In the first twenty-four hours 1400 c.c. of pus were gradually evacuated. In spite of this, the patient developed precordial

pain on the following day, with an irregular pulse. She was quite distressed. The drainage was therefore temporarily stopped, and slowly resumed on the following day. There was constant improvement in her condition, but the temperature remained high, and after about a week the pus became so thick that it was unable to flow through the tube. A portion of the eighth rib, therefore, was resected under local anesthesia, large fibrin masses and some thick pus were evacuated, and two short drainage-tubes inserted. The temperature dropped at once, and six weeks later the wound had entirely healed and the lung had fully expanded.

Fig 217 —Typical pneumococcus empyema Displacement of heart to right. Thick pus Rib resection
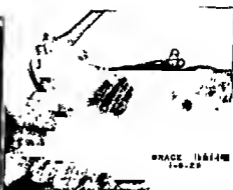
Fig 218 —Same case as Fig 217 eleven days after operation, showing empty cavity and pneumonic process in left upper lobe She healed completely in four weeks

That the closed drainage in the beginning was wisely chosen was evidenced by the symptoms the day after establishment of drainage Had the patient had her thorax opened wide in the beginning she might have lost her life

Case II. Typical Pneumococcus Empyema Complicated by Upper Lobe Pneumonia on Affected Side.—K. G is a girl seven years old, who represents one of the typical pneumococcus empyema cases following lobar pneumonia She was admitted to the hospital three weeks after the onset of acute pneumonia

affecting the left side. The fluid was considerable in amount and the heart was moderately displaced to the right (Fig. 217). Exploratory puncture showed pus so thick that it was difficult to withdraw it through the aspirating needle. In such a case the establishment of closed drainage is unnecessary and may even be unsuccessful because the pus is not likely to flow through the caliber tube usually employed in trocar drainage. It is also known that in patients with very thick pus the surrounding adhesions are strong and the mediastinum has become quite fixed in its position. There is, therefore, usually no danger of an acute pneumothorax. However, in this case we also awaited the result of the culture, which showed pneumococci.

Immediate operation was decided on, and on the second day after admission a short piece of the eighth rib was resected under local anesthesia and two short drainage-tubes were inserted. The patient stood the operation very well and during the first week her temperature dropped entirely to normal and we expected a smooth short convalescence. Then, however, it began to rise again, reached 103° F., and remained high. To determine the cause of these secondary rises of temperature in empyema is not always easy. There are many possibilities. The most likely is retention of pus, either in the main cavity or in an accessory cavity imperfectly communicating with the main cavity. Occasionally one finds an absolutely separate cavity. Other possibilities are lighting up of a pneumonic process, pericarditis, subphrenic abscess, otitis media, peritonitis, joint involvement, or even a general sepsis. In this case, secondary sacculation was ruled out by physical signs, by the knowledge that drainage had been established at the dependent part of the cavity, and that the latter was practically empty, and also by the x-ray.

The x-ray, on the other hand, cleared up the diagnosis by showing a pneumonic involvement of the upper lobe on the affected side (Fig. 218). This was later verified by physical signs. It lasted about four days and did not seriously disturb the convalescence. The child was discharged healed one month after operation.

I would like to say a word about operating on these young children. It was formerly customary to use a general anesthetic, but we now operate on practically all acute empyema under a local anesthetic, including the smallest children In order to do this, it is necessary to gain their confidence, and that is best done by not fooling them. If one promises not to hurt them, one must keep his promise, and with good technic that is possible For the first dermal injection we use a very fine needle which they hardly feel, and from this point all subsequent injections are made. The skin is first infiltrated, then the deeper tissues, and finally the intercostal space above and below the rib to be resected. If one makes sure to infiltrate the intercostal muscles thoroughly there is no pain connected with the resection of a portion of rib, and children stand the operation very well Particularly in children is it important to place them in the proper position, because of the movability of their mediastinum. Placing them on the abdomen is the safest position, because it prevents undue pressure on the opposite side

Case III. Traumatic Pneumonia and Empyema.—This case I wish to show you because it differs from the two preceding cases in that it followed an injury and was caused by the Staphylococcus aureus, which is not commonly encountered in empyema During the war Staphylococcus aureus pneumonias and empyemas were considered very malignant. Chickering at one time reported 100 cases, of which only 2 recovered, one from his pneumonia, and the other after developing empyema. This particular patient got into my hands and after a very stormy convalescence he finally recovered. Since the war I have seen several cases of Staphylococcus aureus empyema which did not impress me as being particularly virulent.

The case I am presenting to you now is a boy, H. C , seven years old, who fell off a wagon two days before admission and struck his chest against the sidewalk. He complained of pain in the chest and abdomen and was unable to sleep on account of it. The diagnosis of his family physician was probable fracture of a rib. Before the accident the child had been perfectly

well. On admission he seemed to be in considerable pain. He held his body flexed toward the affected side. His respiration

Fig 219.—A, Contusion of chest due to fall. B, Four days later, showing a traumatic pneumonia.

Fig. 220.—C, Acute Staphylococcus aureus empyema—one week after accident. D, The same case after establishment of drainage, and almost healed

was shallow and rapid and came in quick gasps. There was no cyanosis. The expansion of his chest was limited on the right

side. His breath sounds were clear and there was no friction-rub. We were unable to feel any evidence of broken ribs. There was slight tenderness throughout, but no serious injury could be detected. Our diagnosis was contusion of the chest with beginning pneumonia (Fig. 219).

On the following day a flattened swelling had developed on the right chest wall which impressed us as a hematoma. The lungs were clear. Four days after the accident bronchial breathing could be made out over the right lower chest, with dulness reaching from the middle of the scapula to the base. The temperature ranged from 101° to 102° F. We made a diagnosis of traumatic pneumonia. Three days later, or one week after the accident, fluid was diagnosed, but because of the absence of distressing symptoms no exploratory puncture was done until four days later, when thick pus was obtained showing Staphylococcus aureus (Fig. 220).

Two weeks after the accident 2 inches of the eighth rib were resected under local anesthesia, thick non-odorous pus was evacuated and two short drainage-tubes inserted. The empyema cleared up promptly and twenty days after operation the wound had entirely healed.

Case IV. Mr. M. M., Acute Empyema Complicated by Hemophilia.—This man is forty years of age and presents several interesting points. He was admitted to the medical service with a diagnosis of right lobar pneumonia, which had started four days before admission with a chill, pain in the right chest, cough, and bloody expectoration.

His temperature ranged from 102° to 104° F., his white blood-cells were 24,000 with 98 per cent polys. The sputum showed pneumococcus Type IV. It was evident that the patient had a typical right lobar pneumonia. On the night after admission he had a severe nose-bleed, almost exsanguinating him, lasting on and off for several hours and resisting all local treatment. On the basis of his history a diagnosis of hemophilia was made. He was treated with serum injections obtained from the centrifuged blood of his wife and responded very well. Fluid

was suspected in the chest as early as eight days after the onset of his pneumonia, but an exploratory puncture was negative. Repeated punctures after that proved negative, so that the medical service was prompted to make a diagnosis of unresolved pneumonia.

Finally, however, about three weeks after the onset of pneumonia, thick pus was found, and the patient transferred to the surgical service. He was a very sick man who, in spite of treatment, had occasional severe nose-bleeds and as a result was not a very good subject for operation. Owing to the fact

Fig 221.—Typical extensive pneumococcus empyema complicated by hemophilia: A, Before operation. B, Thirty-three days after operation. Had been diagnosed as unresolved pneumonia.

that exploratory needles always became blocked with masses of fibrin and clot, it was decided to do a rib resection at once, to evacuate the pus and fibrin, and then to convert the drainage into a closed one. This was done, and 1800 c.c. of thick pus, blood-clots, and fibrin were removed. Closed drainage was established by suturing the muscles and skin around a large caliber rubber tube and then putting this tube into a drainage bottle partly filled with water. After a week the drainage was converted into an open one and convalescence progressed satisfactorily in spite of the fact that hemorrhages into the dressings and nose-bleeds came on repeatedly. The patient made a good

convalescence. His lung expanded beautifully, and he has had no further trouble either with his empyema or his hemophilia (Fig. 221). In commenting on this case let me remind you that the diagnosis of unresolved pneumonia is a very risky one and that the actual pathology in these cases very frequently is an empyema.

Case V. Acute Empyema in an Old Patient, Complicated by Suppurative Chondritis.—Mr. R. P. This patient is a man sixty-six years of age who contracted a right-sided lobar pneu-

ROBT. FOHLE. 10.4.24

Fig. 222.—Shows restoration to normal after drainage of a right-sided empyema in an old patient. Marker indicates site of sinus leading to suppurative inflammation of costal cartilages of eighth, ninth, and tenth ribs

monia Type IV, which ran a typical course, and after the temperature had become normal for a few days, a secondary rise developed, with flatness over the right lower chest and typical signs of fluid.

On account of a complicating myocarditis the patient was very sick and presented a poor surgical risk. His chest contained thick pus, also showing pneumococci Type IV. When first seen surgically his heart was much displaced and fluid extended to the spine of the scapula. Knowing this to be a pneumococcus case, and realizing that the mediastinum had probably

become well fixed, knowing also that prolonged sepsis in this man might be disastrous, an open operation was decided on, which would give him complete relief at once without probably running any risk of a pneumothorax. A portion of the eighth rib, therefore, was resected under local anesthesia, and fibrin and pus evacuated. He stood the operation very well and was convalescing nicely when a complication developed, on account of which I am presenting this patient to you.

While the empyema was still draining a painful swelling developed over the region of the lower costal cartilages on the opposite side of the chest. After the empyema had completely healed, which took about two and a half months, the pain in this swelling became very acute. It was a hard, brawny, red swelling situated over the region of the eighth, ninth, and tenth costal cartilages. It was exquisitely tender to touch, showed no fluctuation, and produced more suffering than the empyema had done. An x-ray was negative (Fig 222). In order to relieve the tension, an incision was made along the left costal arch, under local anesthesia. Thick, broken-down material was evacuated and the wound packed. Involvement of the cartilages was suspected, but could not be demonstrated. There was immediate relief, but the wound continued to drain indefinitely. All this time an effort was made to improve the general condition of the patient, and finally a radical operation and removal of the affected cartilages was proposed and carried out six months after his operation for empyema.

It is well known that suppurative inflammations of cartilages are very difficult to cure and unless operation is effected radically a fistula is likely to form and become persistent. For this reason the operation was planned big, with the intention of removing all affected cartilage. On account of the poor physical condition of the patient, and particularly because of his bad heart, local anesthesia was decided on; $\frac{1}{2}$ per cent. novocain was injected to include the eighth, ninth, and tenth ribs, and the intercostal spaces between these cartilages and the adjoining ones were thoroughly infiltrated.

The fistula was followed and found to lead to the ninth costal

cartilage which had been partly destroyed, while the remaining
portions were yellow and brittle Further examination showed
that the eighth and tenth cartilages were also involved in the
process It was, therefore, decided to remove these also The
affected portion of the skin, the entire eighth, ninth, and tenth
cartilages, with a small portion of rib posteriorly, were re-
moved completely. The wound was thoroughly cleaned The
muscles were undermined and approximated, and the skin then
closed. A small split tube drain was inserted at either end of the
wound The patient stood the operation very well The pain
of which he had complained for months was entirely relieved
and the wound healed by almost primary union His general
condition improved rapidly, as healing progressed, and he is
now in better condition than he has been in for years.

These fistulæ leading to cartilage are always interesting,
because they have usually persisted for a long time before they
come under a surgeon's care, and unless one recognizes them
and treats them radically they are likely to persist for a much
longer time. It seems that granulations do not arise from car-
tilage, or only with difficulty In order to get healing, there-
fore, it is necessary to remove all the diseased cartilage and to
carry the dissection a little beyond into normal bone Diseased
cartilage is recognized by being yellow and brittle. My experi-
ence is that when a costal cartilage is diseased the entire cartilage
is diseased and must be removed

Case VI. Empyema Complicated by a Prostatic Abscess.—
This patient, S. D., nineteen years old, was admitted to the
Medical Service with the diagnosis of lobar pneumonia, left
lower lobe, which had existed for several days He was very
sick. His temperature ranged from 103° to 105° F. Blood
examination showed white blood-cells 22,800, polys 82 per cent.
Sputum examination showed no grouping

A week after admission, which was about ten days after the
onset of his illness, his left chest was aspirated for an accumula-
tion of fluid, which had gradually increased Seven hundred c c.
of rather thick pus were withdrawn, which on culture showed

Staphylococcus aureus. After that his temperature remained around 103° F A few days later he was transferred to the Surgical Service, where the following observations were made: Patient looks comfortable. No cyanosis Temperature 103° F., pulse 90, respiration 30. Chest examination shows the right side to be normal. The heart is considerably displaced to the right, almost to the costochondral junction. There is evidence of an extensive exudate on the left side reaching upward as far as the spine of the scapula. Attempted aspiration was not successful because the needle repeatedly became clogged.

What should be the procedure in such a case? We know that the patient had had a lobar pneumonia of the left lower lobe which had started two weeks before It had therefore probably cleared up. We also knew that the pus was very thick, so thick, in fact, that it could hardly be withdrawn, and that it contained Staphylococcus aureus It would therefore probably be perfectly safe to do an open drainage operation. On the other hand, the heart was much displaced and the sudden evacuation of pus that goes with open drainage might prove a disadvantage. Some form of temporary closed drainage was therefore indicated. A trocar drainage with its small caliber tube is apt not to be satisfactory, especially when we know in advance that the pus is very thick and probably contains many fibrin masses. We therefore chose a method which we employ in patients in whom we want temporary closed drainage through a good sized tube. If the tube should become clogged, or as soon as one feels that closed drainage is no longer indicated, open drainage can be instituted without another operation. The steps of the operation are exactly the same as those for resection of a portion of rib, with the difference that as soon as the resected piece of rib has been removed one does not split the periosteal bed and pleura wide, but simply makes a stab wound and inserts the drainage-tube through this The stab wound should be a little smaller than the caliber of the tube, to insure a tight fit. The tube is clamped and it is fastened to the skin by a suture after the wound has been packed with gauze all around it, and partly sutured. When the need for closed drainage no longer exists the wound

is reopened, packing and tube are removed, and the stab wound then enlarged the full length of the resected rib. This incision causes no pain, and if done along the middle of the periosteal bed, no bleeding whatever. Short large drainage-tubes are inserted and the patient is then treated like a regular open empyema case. This particular method worked well in the patient under discussion. He stood the operation well, and did not complain of any pain. One thousand c.c. of thick pus containing flocculi of fibrin were evacuated at once and the tube then clamped. After he had been returned to bed the free end of the tube was put into a drainage bottle under fluid level and the tube then opened, allowing a slow steady flow of thick pus.

In spite of these precautions the patient continued very sick, he had a septic temperature. Blood-culture was negative. Five days after the closed drainage was established it was converted into an open one. The convalescence was a stormy one, owing to sepsis and secondary pus collections, which were evacuated through the original incision. He was discharged healed about three months after operation.

About two months later, which was about five and a half months after the onset of this illness, he developed acute retention of urine which existed for thirty-nine hours before he was removed to a hospital. The cause of retention was found to be an enormous prostatic abscess. It was drained through the perineum and a culture of the pus showed the same organism which had caused his empyema.

With empyema one is never quite sure that everything is all right until the wound is well healed, and even after healing secondary abscesses or even general sepsis may develop, as this case illustrates.

Case VII. Empyema and Gangrene of Lung.—Mrs. M. W., thirty-two years of age, was admitted to the hospital with an enormous abscess of the right upper arm. She gave a history of having had a miscarriage three weeks before, followed eight days later by a chill, fever, sweats, and swelling of the right arm and shoulder. A few days later she had developed pain in the

right chest, dyspnea, and bloody expectoration. She was acutely ill, had severe pain in the arm, with enormous swelling, redness, local heat, tenderness, and fluctuation. Shoulder motion was markedly restricted. The temperature was $103\frac{1}{2}°$ F. The diagnosis seemed to be metastatic abscess, or possibly osteomyelitis of the right arm, secondary to a miscarriage. The pus was evacuated by multiple incisions and showed Staphylococcus aureus. The patient was irrational most of the time and ran a septic temperature. Two weeks after admission the right chest was noticed to be immobile, the percussion note was flat pos-
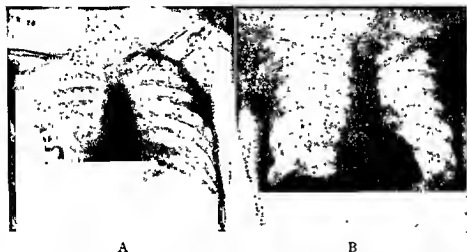
A   B

Fig. 223 —A, Gangrene of lung with empyema, after resection of portion of eighth rib. B, Same case, showing complete restoration to normal after loss of large portion of lower lobe.

teriorly and in the axilla, with absent fremitus and breath sounds. Anteriorly the breathing was harsh and accentuated. Exploratory puncture showed thick pus containing Staphylococcus aureus. A resection of a portion of the eighth rib was done on the following day under local anesthesia.

While the pus was being evacuated a large piece of gangrenous lung presented in the wound and was extracted. Inspection of the thoracic cavity then showed a large red bleeding surface of the lower lobe of the lung with several open bronchi. The impression we had was that the necrotic portion of lung had been held in contact with the normal lung by the pressure

of the pus in the pleural cavity As soon as the pus had been evacuated, the necrotic portion was cast off, leaving the bleeding surface above described. We packed an iodoform tampon against this surface and then drained the empyema. The tampon controlled the bleeding very nicely, and by means of ordinary drainage we succeeded in bringing about healing. The lung gradually expanded and eventually filled the thoracic cavity completely (Fig 223). The necrotic portion of lung represented probably about one-quarter or one-third of the lower lobe. The pathologic report was necrotic lung. We have interpreted the pathologic process as beginning with a septic infarct of the lung, which caused death of tissue with gradual separation of the affected area

The patient continued in a septic state for a long while, developed multiple abscesses on various parts of her body, but eventually made a very good convalescence and was discharged from the hospital about two and a half months after admission.

Necrosis of the lung of this character is not common and this patient is very fortunate to be living after such a severe illness This case also illustrates the value of a good sized incision into the thoracic wall, particularly in those patients who have very thick pus and large fibrin masses, allowing inspection and proper evacuation of septic material. Soon after I operated on this patient I saw another case out of the city with a very similar pathologic condition. The patient had been sick for months and was draining pus through a very small opening. The real underlying condition had never been recognized. She had an enormous pyopneumothorax, bronchial communications could easily be demonstrated. She was so weak and had become so emaciated as a result of septic absorption that she died while an attempt was being made to enlarge the drainage opening in her chest wall. Postmortem inspection showed collapse of the uninvolved lung with an enormous pyopneumothorax in which a very large, gangrenous fragment of lung floated, representing probably one-half or one-third of the entire lung. An earlier recognition and extraction of this necrotic material with good drainage might have saved her life.

Case VIII. Pyopneumothorax.—This case I present to you because it illustrates a certain form of healing which one may

Fig 224 —Tension pyopneumothorax probably due to external infection following aspiration A, Erect position, showing bulging of chest B Latera position, showing fluid level.

occasionally make use of. She is a young woman, H. B., twenty-four years old, who was admitted with a pyopneumothorax of the left chest. She had been taken ill two weeks previously with

a stiff neck, followed by pain in the chest which was aggravated by deep respiration There had been gradually developing dyspnea and a dry cough, but no expectoration.

From the history it seemed that we were dealing with an original pleurisy that had become infected, rather than with a pneumonia. A week after the onset 24 ounces of fluid had been withdrawn by her family physician On admission she appeared acutely ill, was cyanotic, dyspneic, and complained of *pain in the left chest. Examination showed that there was no movement whatever of the left chest and that it looked larger than the right side. The intercostal spaces were bulging* There was tenderness on pressure The heart was considerably displaced to the right. The physical signs were those of a pyopneumothorax with a loud splashing sound The temperature was 104° F , white blood-cells 38,400, polys. 88 per cent. (Fig. 224).

The question arose, How could we explain the presence of this pyopneumothorax two weeks after the onset of what apparently was a dry pleurisy? There were two possibilities. The first would be the perforation of a lung abscess, and the second the entrance of air and infection owing to a careless exploratory puncture The former seemed unlikely because of the absence of productive cough, pain, and etiology. *We therefore decided on the latter.* Owing to the severe dyspnea an immediate aspiration was done to relieve the tension of the pyopneumothorax The pus was of a greenish color and of such offensive odor that the patient had to be isolated

On the day of admission we withdrew 500 c.c., on the following day 875 c.c , and on the third day we did a closed catheter drainage operation with an evacuation again of 500 c c of pus The patient was kept on the closed method of drainage in order to favor expansion of her lung She was put on regular Carrel-Dakin treatment which, however, produced so much nausea and vomiting that it had to be discontinued

On account of leakage around the drainage-tube the closed drainage was converted into open drainage nine days later. We found a collapsed lung covered with a thick green exudate.

No bronchial fistula could be made out. Open drainage was
continued and expansion of the lung was encouraged by means
of arm and breathing exercises and the use of James' bottles.
Three months after operation the cavity was still fairly large,
as outlined by injection with bismuth and oil (Fig. 225). How-
ever, it was sterile, and for that reason we decided to seal the
outer wound after evacuation of the mixture and allow it to
close. This took place very promptly and it has remained
healed since.

Fig. 225.—Cavity partly filled with bismuth in oil After evacuation of the
mixture the cavity was allowed to close.

This method of healing is a very interesting one and may
occasionally be used when the cavity is sterile. Instead of allow-
ing the cavity to obliterate slowly, as is usually the case, one
simply applies a sterile piece of gauze over the opening and fastens
it well in place with adhesive plaster. It is not disturbed for
five to seven days, and in that time the chest wall usually closes
and the air gradually becomes absorbed so that the lung will
become adherent to the chest wall. Almost a year has elapsed
since the time this was done in this patient and she has had
no abnormal symptoms whatever. Frequently, however, this

method has been tried and a secondary accumulation has
formed, necessitating the reopening of the wound   In this par-
ticular case no doubt many months were saved in the con-
valescence because the cavity was still large at the time it was
allowed to close, and with a collapsed lung much time would
have been required to bring about its gradual obliteration.

RESECTION OF THE THORACIC PORTION OF THE ESOPHAGUS FOR CARCINOMA

WHILE we are on the subject of thoracic surgery I want to show you a successful case of resection of the thoracic portion of the esophagus for carcinoma, and briefly review it with you. It was published in detail in the Archives of Surgery for Jan-

Fig 226.—Showing obstruction in lower esophagus as outlined by bismuth.

uary, 1925, to which I would like to refer you. As you no doubt know, the mortality of this condition is 100 per cent. with any form of treatment except surgery. This is due not to the inherent malignancy of the lesion, but to the technical difficulties

of removing it and the danger from infection associated with its removal.

In the patient I am about to show you these dangers were avoided by means of a method first described and used by Dr. Torek of our hospital. The patient, Mr. J. P., is thirty-eight years old. He began to complain of difficulty with swallowing only six weeks before admission. In addition to that he had

Fig. 227.—Showing line of incision for resection of esophagus Drainage opening is shown over eleventh intercostal space.

epigastric pain and vomiting. He had lost 25 pounds in weight. It was impossible to pass a bougie of any size and an x-ray examination showed almost complete obstruction in the lower thoracic portion of the esophagus (Fig. 226). The patient's Wassermann was 2+, although he had an entirely negative history.

In order to make it possible to feed him a typical Witzel

gastrostomy was done and the patient put on a liberal mixed diet, but he gained only very slowly. While trying to build him up his Wassermann was repeated, and this time reported 3+, which induced us to put him on antispecific treatment. In order to make a positive diagnosis an esophagoscopy and bioscopy were done by Dr. John D. Kernan, which showed a squamous-cell epithelioma. On the basis of this positive diag-

Fig. 228 —Showing rubber esophagus in position. It functions well and does not leak.

nosis, radical operation was decided on and was carried out one month after the gastrostomy.

An incision was made along the seventh intercostal space and carried upward posteriorly over the seventh, sixth, fifth, and fourth ribs (Fig. 227). These ribs were divided and the thorax opened wide. The esophagus was liberated and divided below the tumor, the lower end being invaginated into the stomach.

The upper end with the tumor was then freed behind the arch of the aorta and drawn up from behind the arch into the upper part of the thorax and then liberated as far as the neck. As soon as that had been accomplished, the thoracic wound was temporarily partly closed and the patient turned on his back An incision was then made in the neck along the anterior border of the left sternocleidomastoid muscle, the esophagus exposed, drawn out of the thorax, and placed on the chest wall, wrapped in moist gauze. The chest wound was then closed and a drainage-tube inserted through the eleventh intercostal space for the purpose of closed drainage A subcutaneous tunnel was then made on the anterior chest wall from the neck wound to the second intercostal space, the esophagus drawn through this, the diseased portion removed, and the free end sutured to the skin. The convalescence was rather stormy, but uneventful. The thoracic drainage-tube was removed on the fifth day The wounds healed by primary union and after the esophagus had healed into position its stump was connected with the gastrostomy wound by means of a rubber tube, thus making it possible for the patient to masticate and swallow food in the normal way, the food passing through his remaining esophageal stump and then through his rubber esophagus into the stomach He wears the tube constantly It does not leak, and he is able to eat all kinds of food. He has gradually regained strength and is able to work (Fig. 228).

CLINIC OF DR. SIDNEY YANKAUER

Mt. Sinai Hospital

BRONCHOSCOPY IN THE TREATMENT OF LUNG ABSCESS

UNTIL about ten years ago the treatment of lung abscess consisted entirely of medical and hygienic treatment, but about that time, for two reasons, we began to see more lung abscesses than we had ever seen before. One reason was that more tonsillectomies were being done, and the other reason was that in the various tuberculosis sanitariums they had learned to differentiate between tuberculosis and lung abscess, and had begun to refuse accepting lung abscess cases.

At that time these lung abscess cases presented a problem not solved by the ordinary methods, even though the specialists were not behind in their attempts. Cases were treated by spray, by various kinds of vapors and inhalations, by intratracheal medication, and by bronchoscopy and aspiration. But these methods of treatment were not successful. The chief reason for their failure was that in attempting to inject medication into a lung, the volume of fluid contained within the chest was increased and therefore fluid occupied bronchi which it did not occupy before. The result was that whatever benefit was obtained by medication was more than overbalanced by the increase in the area involved in the disease. Now the fluid which is contained in the bronchi in the lung abscess cases is a very viscous fluid which adheres firmly to the walls of the bronchi. The viscosity is so high that it is impossible to remove the secretion with the very fine tubes which it is necessary to use to get into the bronchi (we must use tubes 3 mm. diameter inside and 4 mm. on the outside) even with the most powerful suction apparatus we have.

The problem presenting itself to me in considering this subject was how to diminish the viscosity and the adhesiveness of the

secretions without increasing the volume. This was solved by
the construction of a double irrigating cannula, through one of
whose channels the dilating fluid was injected, while the diluted
fluid was at the same time aspirated through the other. Since
the invention of this method the treatment of lung suppura-
tions in the hands of the bronchoscopist has been successful. I
speak not only for myself but also for the others who have
visited the clinic at Mt. Sinai Hospital, who have seen the work
we are doing, and have followed the methods . Some of these
bronchoscopists have become even more enthusiastic than I
am and have reported even better results than mine, and have
been notably prolific in devising modifications and improvements
of my original apparatus, according to their own individual
needs. The results that I have obtained in lung suppuration of
various kinds have been as follows:

We have examined bronchoscopically about 400 cases. Of
these, only 71 came into our hands for endoscopic treatment.
These 71 cases have been repeatedly treated by simultaneous ir-
rigation and aspiration The total number of treatments amounts
to nearly 3000. Of the 71 cases, 11 cases, 15 per cent , were
cured; 15 per cent. were unimproved, 50 per cent. were improved,
and in deciding what sort of cases should be called improved or
unimproved, we took as our criterion the ability of the patient
to go about his business and to attend to his daily task. Those
cases in which amount of secretion was so far diminished that
they were able to go back to work and come into the hospital once
a week, or once a month for treatment, were considered improved
The cases which could not do this we called unimproved.

A number of the cases went to operation—10 per cent. A
number of the cases, about 10 per cent., were unaccounted for.

The greatest difficulty in initiating this method of treatment
was to gain the confidence of the general practitioner, who feared
danger in the procedure because the cases were sometimes sub-
jected to reaction following bronchoscopy, and this reaction was
at times quite severe (rise in temperature for twenty-four hours).
Altogether, 8 of the cases died, 4 of these were operated upon,
and the deaths were postoperative. One of the cases had a

myocarditis. She was treated a number of times, in spite of the fact that she could not stand the treatment very well. She gradually weakened and died. Another of the cases was kept under treatment for a year with apparent improvement, but at the end of a year, during an influenza epidemic, became ill with pneumonia and died. Two of the cases died soon after bronchoscopy, due to the reaction; one had a chill and rise in temperature and died in twenty-four hours. The other remained alive for five days, when with a rise in temperature she developed pneumothorax and died. These 2 are the only deaths attributable to the bronchoscopy, and this is the measure of mortality in endoscopic treatment in lung abscess—2 cases in 3000 treatments.

In bronchoscoping a patient for lung abscess the first bronchoscopy is always a diagnostic one, and the following are the treatments. The diagnosing bronchoscopy is of the utmost importance. In the first place we must diagnose the presence of a lung abscess and eliminate other conditions, and in the second place we must diagnose the nature and character of the abscess itself. The lung abscess must be differentiated in the first place from abscess due to the presence of a foreign body. Foreign bodies of metallic origin are always found by the x-ray. The foreign bodies which do not show by x-ray are another story. In chronic cases they do not give the valve action described by Dr. Manges this morning.

The first case of lung abscess that I bronchoscoped was a patient who denied having inhaled a foreign body, but a chicken bone was removed from his bronchus. A number of other foreign bodies have been found in lung abscess cases, one of the most interesting of these being a patient supposed to have a post-tonsillectomy lung abscess. We found a piece of bone in the abscess cavity which the patient denied having inhaled, but it was later discovered that at the time of tonsillectomy, which was done under general anesthesia, one of the turbinates was removed, and on examination of the foreign body we found that it corresponded quite well with the shape and contour of the turbinate bone.

It is important to eliminate in every case the presence of a foreign body as a cause of lung abscess before attempting to operate upon this condition. Failure to find a foreign body which is the cause of the abscess is rare, and even though it is possible, this fact does not interfere with the statement that every lung abscess case should be bronchoscoped before surgical interference is attempted.

Quite a number of our cases have turned out to be malignant. The examination of our record shows that most of the patients who begin to have symptoms of lung abscess after the age of forty have a malignant growth even if it is not demonstrable. Benign growths have been found in 2 cases. In both these cases fibroma was found, and in both removed endoscopically, and the lung abscess eventually cured.

Extrabronchial growths have been recognized in a number of cases. It is not possible, of course, for the bronchoscopist to make a diagnosis of the nature of the extrabronchial growth unless it happens that the location of the pressure upon the bronchus is suggestive of a diagnosis. We may find bronchiectasis unilateral or bilateral. When bilateral, operative procedure at the present time is of questionable value.

Having established the presence of a lung abscess, the next thing to be noted is the extent of the suppurating area of the lung. This may be ascertained by bronchoscopy, for it tells us from which branches the pus is coming. In this way we can also say with certainty in which lobe the abscess is located. This is particularly of value in distinguishing between an abscess in the middle lobe and one in the upper part of the lower lobe, these two areas being superimposed on the x-ray plate. In like manner, if the abscess is located near the hilus, it is difficult to distinguish by radiography in which lobe it lies, but the bronchoscopy tells us with certainty.

Having determined these features of the diagnosis, we come to the treatment of the cases. In some cases we find at the first treatment that we suddenly get an evacuation of a large quantity of fluid from one of the bronchi. Following such an occurrence there is likely to be a rapid improvement of the condition of the

patient, and a cure is accomplished after two or three bronchoscopies. In the cases that we have cured in this way there was probably not a true lung abscess, but a condition which might be characterized as a chronic localized suppurative bronchitis. The rapidity and completeness with which such patients recover from their condition after one or two or three bronchoscopic treatments is one of the most dramatic and surprising things about endoscopic treatment of this condition.

It is quite possible that such a localized suppurative bronchitis may give an x-ray picture showing a fluid level because the pus lies in the same level in all of the bronchi, and their superimposed shadows give rise to this appearance whether the picture is taken in the upright or in the recumbent posture.

On the other hand, a true lung abscess is not present unless ulceration of the bronchi has taken place and pathologic communication has been established between them so that there is actual destruction of tissue. When such a well-developed abscess has been formed the cavity is surrounded by an area of consolidation. In these cases the bronchoscopic treatment is not so simple nor does a cure result in such few treatments. We may treat such a case by an attempt to evacuate the abscess cavity. For this purpose the cannula with a flexible end devised by Dr. Lynah and which has been combined with a specially constructed bronchoscope by Dr. Lukens, is an admirable device. Previous to Dr. Lynah's invention I had been using a metallic cannula to the end of which a flexible wire was attached and the whole covered with a rubber tube. That served the purpose well enough, but was not as elegant an apparatus as Dr. Lynah's.

In these cases the disease is not in the cavity itself, but in the pneumonia surrounding it, and we must attack the disease by attacking the periabscessal pneumonitis. This is accomplished by irrigating each bronchus from which pus is seen to come and to continue irrigation until the lung is clean. In this way the periabscessal pneumonitis is diminished, the abscess wall has a chance to shrink, and the cavity to close.

If we follow these cases with the x-ray we will find that in the early cases in which the abscess wall is soft the cavity col-

lapses, the infiltration disappears, and the x-ray shadow disappears completely, but in the older cases in which the abscess wall is already composed of organized fibrous tissue, the x-ray shadow will not completely disappear but a small shadow will remain at the site of the abscess cavity, indicating the presence of a scar in the lung. One of my cases, a posttonsillectomy abscess of one year's duration, was cured after eight months of irrigation; the last irrigation was performed in 1917—the patinet has been continuously well as far as her lung is concerned during this time, in spite of the fact that the radiograph still shows the presence of the scar in the lung. This patient has been anesthetized twice during this time without disturbing this scar.

Finally, I would like to say a word about the most effective treatment that we know of—the prophylactic treatment. Fully 25 per cent. of lung abscess cases are due to tonsillectomy in adults under general anesthesia. If we performed our tonsillectomies in adults under local anesthesia these abscesses could, with very rare exceptions, he prevented

THE WOMAN'S HOSPITAL

CLINIC OF DR. GEORGE GRAY WARD

ASSISTING:

DR. BARRETT: Picric Acid in Obstetric Cases.
DR. RICCI: Inflammatory Adnexal Disease.
DR. COBURN: Gum Glucose in Surgery.
DR. FARRAR: Curettage, Trachelorrhaphy.
          Radium in Carcinoma of Cervix.
DR. KENNEDY: Isthmospasm of the Fallopian Tube.
DR. LABAT: Spinal Anesthesia.
DR. MATTHEWS: Orthopedics in Gynecology.

ORGANIZATION OF THE SERVICE OF THE WOMAN'S HOSPITAL
DR. GEORGE GRAY WARD

WE have here in the Woman's Hospital the students of the Cornell Clinic who work all day long for a two-week period and every Tuesday and Friday we give a demonstration clinic, which I shall carry out in the usual way today with the exception that I have asked some of the young men on the staff of the hospital to say something to you in the interest of the operation. Before beginning, however, I wish to say a few words about the organization of the hospital.

The Woman's Hospital was organized in 1855 when Dr. Marion Sims was the first man of his time to practice gynecology as a specialist. Marion Sims came from the South with his operation for the cure of vesicovaginal fistula and with the purpose only of interesting people here in the cure of vaginal fistula. We have here the original records of the hospital, and you will see that the first case in the hospital came in for the repair of a vesicovaginal fistula, which was much more common then than now. If you will look over the book you will see, however, that very soon after they started they began to do other

things in the way of surgical repair. The hospital, with Dr. Thomas A Emmett as Dr. Sims' assistant, achieved a great name. Far and wide throughout this country and also abroad persons looked to it as an authority for anything in gynecology.

The Woman's Hospital has a fine plant, but, as is apt to happen with an institution of great traditions that has run for many years along traditional lines, it was thought about six years ago that there should be a reorganization to bring it more into accord with modern ideas It was at this time I came into the hospital, being asked to take it over as chief surgeon and to organize it along more modern lines.

At that time there were six gynecologic services here and one obstetric service, all in charge of attending surgeons. Each service had its own assistants, out-patient department, and its own staff, orderlies, technic, etc., each running independently of the other, with the result that there was considerable lack of smoothness in function. When I took hold of it it was top-heavy, there were too many men on the staff; too many services for the material. It was my idea that the hospital should be one big clinic—one instead of seven—and so the organization was changed to four surgeons in gynecology and one in obstetrics, with six wards in gynecology and obstetrics

The material coming in from the O P D. is assigned in rotation to the four divisions in gynecology. The attending surgeon puts the tentative diagnosis on my desk within twenty-four hours so that I may see it   The material is then redistributed by me to the four divisions so that it is as equally balanced as possible. If one man has 3 or 4 cases of fibroids and another fibroid comes along, the case is reassigned; if another surgeon states that he wishes to do a certain operation I give him all he wishes of such operations. In this way the service is balanced and the men are given special material. The control of the material is in my hands, so that no division has more than another   There is no control by me, however, as to what shall be done with a case, or what the operation shall be. Each man has a free hand to treat his case as he will, the only requirement is that he must report his results at the staff conference.

Follow-up results are attended to each week in a staff conference of the entire attending staff. The clinical staff in the O.P.D., the interns, and the others are all present. We have a regular program of one hour, showing the pathologic material of the week, etc., each division reporting its casualties, deaths, infections, complications, and mistakes in diagnosis. If a surgeon has a death, he must give a report and demonstrate to the conference that the case was properly cared for. There is no criticism at the conference. The men show simply what has been done. A stenographer is present so that a record may be kept.

After this we have the follow-up reports of each division once a month. In the O.P.D. the men in my division and I attend, with my first assistant, every Wednesday morning at 10 o'clock. If the surgeon himself examines his patients after operation the patients will return. If he intends to delegate it to his assistant or to the O.P.D., they will return once, but not more.

We issue a volume of scientific reports nearly every year. The men are asked for their contributions, and we feel that if a man cannot do something for the welfare of the institution he is in the place of someone who might serve it better. Our record is one that the staff have tried to build up. That means not only a record, but a statistical analysis made of the records each year. Each man on the staff has his mortality rate and infection rate known; we know each other's percentages. This is very effective, and since we have put it into practice we have seen a decided improvement.

We require a definite preoperative study in every case. Patients are not operated upon without this except in an emergency. We must have a blood study, blood-pressure, combined blood-count, urinalysis, etc., and these must be in the hospital three or four days before the operation. The result is that in the last year we have had a mortality of 1.6 per cent. from all the cases in the hospital, which we feel is very good. So much for a description of our methods here in the hospital. I will now ask Dr. Barrett, my assistant obstetrician, to speak to you of some work that we have been doing in the use of picric acid in confinement cases.

THE USE OF PICRIC ACID IN THE PREPARATION OF THE VAGINA AND PELVIC FLOOR IN OBSTETRIC CASES

Dr. Ralph Barrett

When I came to The Woman's Hospital it was the practice to use a wet scrubbing with soap and lysol poured on and scrubbed off. It struck me that that might wash a lot of stuff into the vagina that was not there, and so I asked Dr. Ward's permission to try out an experiment with picric acid and alcohol. The technic is very simple. We use 7 per cent. alcohol and 2 per cent picric acid and we wash simply the exposed portions of the vagina. If we are going to bag a woman, we occasionally use dry cotton and picric acid directly. The woman sometimes complains of the pain of the alcohol, but the pain is very slight. We started the procedure last summer, about July, and tried it at first on the ward cases. They were labeled "picric cases," instead of wet scrubbing. We ran this until October, comparing results, and then, with Doctor Ward's permission, we put it in as the standard technic of the hospital and practically every one now uses it in delivery cases. We tried it out on alternate cases from July 15th to October 4th of last year. We delivered 70 cases by the lysol method; of these, 14 were operative cases. In these 70 cases we ran 15 of high morbidity, and we considered our morbidity temperature (100.6° F.) nothng in the forty-eight hours if it dropped right down again. If it shows a record of 100 6° F after the forty-eight hours it was included in the morbidity. Occasionally we have real pelvic infections.

During the same period we ran 80 cases treated with picric acid, and in that number had 37 operative deliveries. In only 5 cases was the temperature 100 6° F, or about 5 per cent. of the cases. I have looked roughly over the deliveries in the last two years and have found that in the 1474 deliveries since May, 1922, by the lysol technic, we had nearly 100 cases of pelvic temperature, while since October, 1923 we have delivered 1201 cases with the picric technic with only 31 cases of pelvic temperature. On this standard we decided it was a good thing. It is easier, does not stain anything, and the result is satisfactory.

OPERATION FOR THE REPAIR OF LACERATION OF THE CERVIX CYSTOCELE, RECTOCELE, AND PELVIC FLOOR

Dr. George Gray Ward

This case is a patient needing plastic repair. The history is as follows:

Age thirty-four, white, married. Chief complaints: (1) Bearing down pain, more especially at menstruation, (2) menstruation every twenty-two days, (3) headaches, (4) backaches. The family history is negative. The regular period of her menstruation is every twenty-eight days, no pain, moderate in amount, the last period one week ago. The patient has been married sixteen years. She has three children, five, three, and two years of age, respectively. She has had one miscarriage. Puerperal negative; venereal history negative. During the past year patient has had menstruation occurring every twenty-two days, with the passage of clots. She has had backache, headache, bearing-down pains. Her vaginal discharge has been slight and her bowels regular. Her general condition is good.

Physical examination reveals a patient 5 feet, 3 inches tall, well developed and nourished, with normal head, neck, thorax, heart, and lungs. Abdominal and pelvic examination negative. Wasserman negative. Urine examination negative. Blood examination: Red blood-cells 4,680,000, hemoglobin 85 per cent.

Diagnosis· (1) Left unilateral lacerated cervix, (2) cystocele, (3) rectocele and laceration of the pelvic floor.

The chief complaints of this patient as you will have noticed are a bearing-down feeling, especially at menstruation, backache, and headache. The principal complaint for which she comes in is that she has a pelvic feeling as though her insides were coming out.

There is a considerable gap between the posterior and anterior vaginal wall. The vaginal mouth is hanging open. Of course, when she has an anesthetic the vaginal wall is relaxed and so hangs out. On examining this woman we know that if she strains the least bit she rolls down the anterior wall, which is quite sufficient to cause her trouble. She has a moderate degree rectocele, has the drag on her back, the result of this injury, and

she has a laceration through her cervix Her normal type of bleeding is twenty-eight days with four or five days' duration. She is now bleeding every twenty-two days, with a tendency to increase the hypersecretion between the periods, so that we feel there is probably a hyperplasia of the endometrium, of which we formerly spoke as endometritis We shall, therefore, curet this case, repair the cervix, and do a cystocele operation.

The question of curetting is one of great importance. Many of us feel that it is at times quite a complicated procedure, and not so simple as it would appear Therefore, I take great pains when teaching the simple operation of curettage. Many of you who are distinguished surgeons will bear with me as I teach my students here

First, notice the tray and the arrangement of the instruments They are arranged in a definite way so that I pick up each instrument from right to left I take hold of the cervix, so I have examined this case first in order to be sure of the position of the uterus and to make certain that I have made no mistake in my previous diagnosis Then I make a preliminary sounding, rolling the uterus in position I wish to know the shape of the canal. It is a little smaller than normal I shall, therefore, first stretch the cervix so that I may use the curet. This done, I am able to insert my curet without difficulty and without laceration of the cervix Now comes the curettage I have a curet here First we look at the picture which shows the general shape of the uterus Then we look at the next picture, which shows the profile view of the uterus You will notice the difference between the anterior and posterior surface and realize how narrow the canal is The next picture shows the way we are facing the patient. You see a triangular cavity, very acute in the horns. Now remember the side of the picture and you will realize that with the normal bending of the uterus you have two surfaces like that, one convex, the other concave, the triangular surface of which is pictured there.

We go over the two flat surfaces carefully with the curet, going from side to side and downward, so that we cover the surface. When this is done we are ready to curet the fundus

We have another pair of curets on hand if we need them; if the pair we are using are too large we use a pair a size smaller. But with the horn of the uterus there we cannot get up into that horn, and that might be the very spot where you wanted to get a beginning carcinoma.   So we have a very small curet with which one can get up into each horn, curetting the whole surface of the uterus.   If we wish to remove the epithelium, we must do it thoroughly, but that doesn't mean roughly.

I am able now to pass the curet and am now curetting this flat angular surface from side to side.   I do this for a few times until we have it fairly smooth   This done, we go to the posterior wall and do the same thing.   Having smoothed it out, we remove any exuberant tissue and then, taking a small curet, go first into one horn and then into the other, then going from horn to horn until we feel that we have covered the ground   We are trying to curet anatomically.

We use a simple solution now to wash out the débris.   I like to pass a little iodin into the cavity of the uterus   Occasionally there is a little trouble there that may cause infection.   The curettings are sent to the laboratory with the patient's name, the diagnosis of the surgeon, the date of menstruation, and such other data as is necessary   In this particular case there does not seem to be a very marked condition here, but a little tear which we may as well correct while we are about it.   The tear is not on the right side, but mostly on the left.   We follow it up and remove the tissue on the lower lip first.   In this way we can remove the strip of tissue very carefully with the knife, the idea, of course, being to convert this patent canal into a tubeform shape so far as we can.   In all cases that show signs of gonorrhea we do an operation like that of Dr. Sturmdorf, who cuts out the diseased glands which keep up this condition.   We now place the sutures as you see in the lantern slide, first on one side, and then on the other.

When it comes to this part of the operation I am invariably reminded of Dr. John Clark, who, at this time, made a great importance of the fact that you should not tie a blood-clot into that angle, and the necessity for keeping it well separated and not

tying the sutures too tightly   We use what is called Luken's
tanned gut.   Now we are through with this surgery

The next step is the operation on the cystocele. We have
converted the cervix into something that is more nearly its
former condition   Now I shall demonstrate to you the fact that
in this patient there is a distinct fall of the bladder from the
normal   I am placing a sound in the bladder   The instrument
is in the bladder and the bladder comes down to that point here.
You will realize, then, that the bladder is much lower than the
urethra and in that position there should be a straight line, like
that.   You can see the picture that we have here, showing the
normal relation of bladder and uterus   See the straight line
the anterior vagina makes   With a woman in a standing posi-
tion you can appreciate that normally the bladder is like a
douche bag with the opening at the bottom.   In other words, she
will completely expel her urine, leaving nothing of residual urine
in the bladder.

The next picture gives the idea that there must be a shortened
vagina.   If the fascia is torn, it is very apt to be torn close to the
cervix, and you see this line between the bladder and the vagina
which will allow it to stretch.   The next picture shows what you
see now, a teapot instead of a douche bag.   This gives you the
idea that the spout is higher than the rest of the bladder, so that
the urine will have to go up hill instead of acting as in the normal
position.

We want to be sure of the fascia   This prolapse of the
bladder is really a hernia   If you do not unite your fascia, you
know the value of the hernia operation.   In the old days we did
the operation on the mucous membrane of the vagina, but you
know the result.   There was little or no permanent value in the
operation.   That is one condition that has been corrected   The
other is this; if you just suture the fascia, you still have this con-
dition: and I think that by the replacement of the bladder in the
normal position, so that you can push the teapot back into the
douche bag position, you obtain a normal result.   So we do this:
we present these two pictures to show the ligaments.   The next
picture shows the fascia showing under the bladder which is torn

or damaged somewhere between the bladder and the vagina. We should repair that fascia as we should also put that bladder back and convert it into a douche bag type, if we can.

We first separate the bladder completely from the anterior vagina and from the uterus so that it is perfectly loose. Then we make it revolve around its axis so that it will straighten out the floor. Next, we do it in somewhat that way. If we take hold of the bladder and put in a stitch, that straightens out the floor and makes a douche bag at once; then we take two stitches through the uterus and the vagina there, getting rid of the excess length and at the same time closing the rent in the fascia. These two stitches we call angulation stitches and at the same time we have corrected the bladder. If you do this I am quite sure you will get rid of your cystocele.

Now I am very fond of the technic of Watkins, of Chicago. He takes up a forceps and puts it in the vagina, that way, and takes up a smaller pair and makes a fold, then with the scissors he slits through, like that; then he slides the scissors underneath the vagina between the fascia and the vagina. Then it is easy to open that up.

Having opened between the vagina and the fascia, we generally take a knife and take one side, so, make a little incision, and then go down and push the fascia right back, leaving it attached to the bladder. We loosen that up; here is the fascia, and there is the fascia, and we pick it up here and here. Now if we will free as far as possible, and slip the bladder forward we have it quite loose. We take a stitch and take hold of the bladder which is quite loose, and fix this here and there. We go quite high up above the internal os. The denuded surface will unite here very strongly and you will have a fairly straight line where you did not have one before. The next step is to close and put in angulation stitches. Here is the fascia and here the cervix. Here is the fascia again on this side, and here again on the corresponding side. There is one angulation stitch. It went high and will close that fascia and will angulate the vagina in the way I have described. Another is put in now in just the same way. Now two angulation stitches are in. This is a very small one, and

it is not apparent here as in some other cases. This particular
spot is what is pointed out as a "weak spot," and that is why we
put in two stitches forward. The two angulation stitches are
now tied, and this closes the upper part of the incision. You
know, of course, that we can work very much faster with contin-
uous sutures, but we feel we can get much better results with the
others, and so we use them.
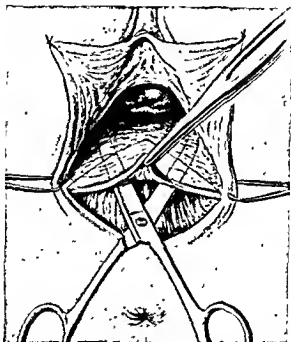
Fig. 229—Technic of rectopexy for rectocele. The vagina is separated
from the rectum with scissors. Note that the dissection extends well above
the line marked for the excision of the vaginal wall.

In my experience of these cases with considerable resection
of the anterior wall, there is sometimes a little oozing. We have
been in the habit of taking a little rubber tissue, like this (rubber
tissue tied in the middle with catgut to which a small piece of
iodoform gauze is tied), which we call a Y-drain, and pass it up
one side of the line of suturing, and then the other arm up the
other side in that way. The little Y-drain comes out through the

last few stitches, taking care of any oozing that occurs. It is very easily removed and will be removed on the second day. You will find this a very valuable procedure and one which saves a considerable amount of trouble.

Having straightened that, we next have to shut the door. This throws the cervix back, and that is soon done. We have been in the habit of teaching the students that they must realize
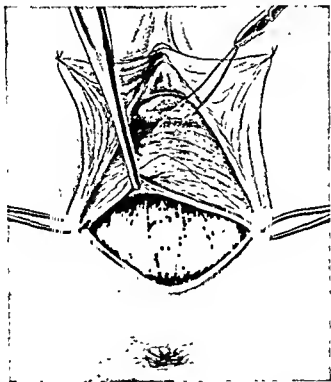
Fig. 230.—Technic of rectopexy for rectocele The rectopexy suture that is to draw up the rectal pouch to the upper undamaged part of the vagina is in place.

the mechanism of the closure in the vaginal mouth. The vaginal mouth closes like your own mouth, and not like a foramen. Many men have the idea that the vaginal muscle is there and that there is a distinct sphincteric action, shutting up as the rectum is closed. We do not teach that. We teach that it is a fixed upper jaw and a movable lower jaw which opens and closes, a transverse slit from side to side which is perfectly

obvious. When this contracts it elevates not only the whole
anus, but the whole rectum, and incidentally the perineum and
the whole posterior vaginal segment. If you cut the masseter
muscle, the muscle is overstretched or torn because all the
muscles have been injured and all the strain comes on the fascia,
that is what gives way. If you realize this you will realize what
your problem is   Our problem now is to arrange this so that this
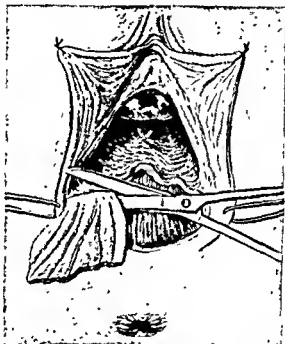
Fig 231 —Technic of rectopexy for rectocele   The excess vaginal wall
is cut away along the line previously outlined, the edges are united by inter-
rupted sutures

woman can shut her vaginal mouth. We shall now try to
correct it

Observe the picture as she lies here. We regard the rectocele
and treat it in the same way we do a hernia. We believe the
fascia there has been injured and that it has allowed these com-
plictions to develop, and that the fascia has been injured in the
lower portion of the vagina, having increased the size of this

posterior wall by the stretching. We can eliminate that. We separate the rectum from the posterior vagina and loosen it, in other words, do what I call rectoplasty. The fascia with the lower jaw is brought up against the upper jaw. We follow that principle here in this case and outline what we are going to do, as you see in the picture. Picking up this tissue here, we begin in the middle so that we can get between the rectum and the
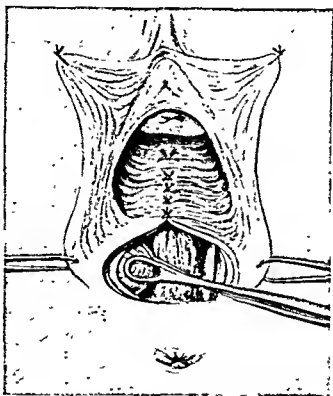
Fig. 232.—The levator is drawn out on either side and united in the midline
Note the edge of the fascia.

posterior vaginal wall. When we get to this part, we put a sponge here and push it back under the sulcus so that we can get at and see the muscle. Having separated either sulcus fairly well we come to the rectocele. We carefully pass the closed scissors and open them, so. I can now pass my finger between the rectum and the posterior vaginal wall, way up here, and can demonstrate the rectum to you here. It is perfectly loose and

you see what I can do to it   In other words, I can tip the rectum,
so.   Now I put in a stitch which we call rectopexy   You see it
there.   There goes the main loop through the posterior thickness
of the vaginal wall   Now I pick up the rectum and pick up here
the fascia over this rectum, so   So I close the opening on the fascia
and now have it come out at one side   The stretching is just
as you see it in the picture.   You can see that when I pull on it
it draws the rectum right up   In other words, we shift the
rectum up to the uninjured part of the wall   We have shifted
the rectum, now we take out the sponge from the rectum   The
next step is to get rid of this flap as we have outlined it.   There
is the triangular piece of the mucous membrane and the rectum
is lifted up   We now close this triangular denudation and then
we come to the rest of the closure   While I am doing this, which
is somewhat monotonous, I will ask Dr. Ricci, one of my staff,
to speak to you on a subject which is of considerable interest to us
and which I hope will be to you.   Dr Ricci has gone over the
records of 1500 cases of inflammatory diseases of the fallopian
tubes and the deductions he has been able to draw from that careful
analysis I think are of value

A STUDY OF 1500 CASES OF INFLAMMATORY ADNEXAL DISEASE IN THE WOMAN'S HOSPITAL

Dr. James V. Ricci

The survey covers 1500 inflammatory cases of adnexal diseases   The study has been undertaken to observe the incidence
of mortality and morbidity following operation   Of these 1500
cases, a vast majority, 1250, have shown chronic inflammatory
lesions of the tube without pus or bacteria   Four out of 5
patients are free from pus or bacteria—so that is of great importance, inasmuch as they prove that these cases of pelvic inflammation, if let alone long enough, will eventually undergo autosterilization of the bacteria, become destroyed by autolysis or
resolution, or both, i. e., will undergo disintegration or absorption.

Now the mortality occurring in that group, 240 remaining
cases showed either chronic or acute, or combined chronic and

acute purulent conditions Two hundred and forty cases showed pus; and of these, in 90 cases there was pus without bacteria. These facts are likewise important, inasmuch as it shows the course of events in the pathology of pelvic suppuration. The first step is the disappearance of bacteria; and the second, of the pus.

There occurred 11 deaths. In other words, the mortality rate in the chronic non-purulent cases was less than 1 per cent., whereas I had to report no less than 33 deaths in the 240 purulent conditions, a mortality rate of 14 to 15 per cent.

Any surgical procedure, of course, with a mortality rate of 14 to 15 per cent., ought to be discarded.

Now let us review the incidence of mortality and of morbidity, and by morbidity I mean (1) the occurrence of shock, post-operative, traumatic shock; (2) inflammatory reaction; (3) prolonged irregular fever; (4) prolonged hospital convalescence. Comparing these groups, we find that in non-purulent conditions there occurred no shock In the purulent cases there occurred 13 per cent. shock severe enough to jeopardize the patient's life, to produce 4 deaths, and shock to disturb and prolong the patient's convalescence.

In the chronic non-purulent conditions the immediate febrile reaction was not above 103.4; in the purulent conditions there occurred in 12 per cent. of the cases a febrile reaction of 105.4.

In the chronic non-purulent conditions 85 per cent. of the patients left the hospital by the end of the twenty-fifth post-operative day; in the purulent conditions, only 30 patients left the hospital by the twenty-fifth day.

What is the cause of this prolonged postoperative morbidity? A series was drained abdominally; 40 per cent. of these left the hospital the twenty-fifth day postoperative, and the others remained from the twenty-sixth to the ninetieth postoperative day.

A third series was drained vaginally alone. Ninety per cent. of these cases left the hospital on the twenty-fifth postoperative day.

In view of the fact that pelvic suppuration is a self-limiting

disease; in view of the fact that if let alone the tubes will reach a stage of chronicity and the pus undergo resolution; in view of the fact that the morbidity and mortality are minimum in comparison with those occurring in the purulent cases; in view of these outstanding features, we recommend that waiting be prolonged at least three months before operation.

DR. GEORGE GRAY WARD

The practical point comes out, as Dr. Ricci said, we have been in the habit of following the dictum of Dr. Simpson in 1889, who
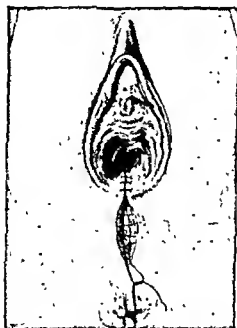
Fig. 233.—The fascia is united with a continuous buried suture A subcuticular suture closes the skin and the two ends are tied together.

pointed out the importance of waiting until all febrile symptoms had subsided after examination If you have an acute disease, and examine the patient, you will find a rise of 99.5° F. or more the next day; and until that has subsided it is not safe to operate. This study that we have made has certainly shown us that we should wait very much longer than three weeks; that you will get

better results if you send the patient home and wait three to six months.

Now this operation has reached the fascia stage, where we sew together the trigone, etc. That is a very simple part in the operation. We simply use the continuous stitch and unite the fascia. You can see now that we have reached the end of all, excepting the mucous membrane. I put a half-stitch in that suture, and we always close with a subcutaneous stitch. We find that most valuable. We have the muscle together; we have the fascia over it together, and now I will put over it these subcutaneous stitches which will save a lot of pain and leave no stitches to take out, and insure primary union. Now that is finished. You see I can put my finger in and separate it sufficiently.

While we are getting ready for the next case of retrodisplacement, I will say a word about the treatment in cases of not over-robust patients who have after a simple operation the effect of prolonged operation, and possibly we fear that they may have some shock. We rely greatly on the blood-pressure reading as to the condition of the patient after operation. The preoperative blood-pressure is taken, and then immediately at the close of operation the anesthetist again takes the blood-pressure. We found in a series of 300 cases that if you have a drop of as much as 25 points it is something that needs attention, coming near the shock line; and in cases where you are going to have a prolonged operation and fear shock, we give gum acacia and glucose—a combination suggested by Erlanger, of St. Louis. A combination of gum acacia and glucose will raise the blood-pressure. During the war we used ordinary gum acacia; the preparation was made and 1000 c.c. run in rapidly. This is not the best method at all, and we have to call attention, as Sir William Bayliss, of London, has repeatedly done, to the very great care in preparation before you use it at all, and to secure the purity of the product, which is not easy. Here is a preparation almost as clear as water, a solution made in Liverpool, England, that is 6 per cent. gum acacia and 20 per cent. glucose; I have had Squibb make it up for me, also, and there is his solution made in ampules,

but they have never yet been able to make it quite as clear, though it has given just as satisfactory results. We use only 250 c.c. instead of 1000 c.c, and it must be given at a very definite rate; 4 c.c. to the minute is the rate which has been established by Woodyatt for a patient averaging 150 pounds; and he established that that amount of sugar could be put into the blood without showing in the urine, using it at a temperature of 105° F., that will raise the blood-pressure often above normal, and will maintain it for several hours, as much as five to six hours. So that if you have a case which has lost a lot of blood and you run in saline solution, you know that it runs out again as fast as you put it in; but with the gum solution it maintains the pressure because it does not go out; and you can hold the patient until you can type the blood and get a donor for a transfusion, but if you have a case that suddenly goes bad, while we are waiting for the transfusion we run in the gum glucose until we can get in the transfusion

Dr Coburn, the anesthetist, has been interested in studying blood-pressure, and he will speak to you on that subject now.

BLOOD-PRESSURE IN OPERATIVE SURGERY AND GENERAL ANES-THESIA WITH ESPECIAL REFERENCE TO THE USE OF GUM GLUCOSE

Dr. Raymond C. Coburn

The study of blood-pressure in general use, as well as in surgical use, has come into prominence in the last few years and is especially useful in surgical procedures, first, as a means of estimating the patient's resistance or ability to stand the operation, and, second, to reveal the depression that follows a serious and prolonged operation in the treatment of shock. In dealing with blood-pressure, in the surgical sense, it is first necessary to establish its normal level for that particular individual, and that is not as easy a proposition as at first sight it seems. The excitement attending the examination by the physician will often with some patients greatly elevate the blood-pressure; and likewise on admission to the hospital, the excitement of the transfer of the patient and the idea of entering an institution will, especially

with the patients we have here, affect the blood-pressure As
Dr. Ward has just said, on entering the hospital the patient's
blood-pressure is taken; then just before the anesthetic is ad-
ministered. If the patient has very abnormal blood-pressure,
or if for other reasons is kept in the hospital, then the blood-
pressure is taken at frequent intervals during the study, and we
have established the principle that the lowest blood-pressure is
taken as the normal level of the pressure for that patient. It is
very important to get that normal level established, because
when it comes to estimating the effect of shock, on the knowledge
of what the normal blood-pressure is depends the subsequent
reading of the blood-pressure. With the vast majority of pa-
tients in the hospital we find the blood-pressure elevated ten
or twenty points above the normal. Just before the anesthesia
is administered it is again elevated 15 to 30 mm., or even to 90
mm., so that you would have an erroneous idea of the patient's
blood-pressure had it not been taken on previous occasions and
its level somewhat established. There is so much variation
in the elevation of the individual to these stimuli of blood-
pressure that it is necessary in each individual to study it, for the
general tendency will not give light on any particular case. Each
is a law unto itself.

We have, then, this as a general tendency: a rise on entering
the hospital, another rise just before the anesthetic is given, and
with most cases the pressure continuing to rise for a few minutes
after; then, in prolonged cases, it takes a fall. This is where the
benefit of the establishment of the normal level for the individual
case is apparent.

Dr. George Gray Ward

I would like to interrupt Dr. Coburn a moment to speak
about the case to whom the glucose is to be given. Her history
is one which brings out certain interesting points. She has
come to us because of bearing-down pelvic symptoms and a dis-
charge which has been going on for some time during the last
year. She is twenty-two years of age. Her family history is
negative. She has had four pregnancies, two of which were full
term and two miscarriages, five and a half months and six weeks.

She has suffered from backache since the first miscarriage The rest of her history is not essential She had a blood-pressure on entering the hospital of 110/80, and here it has run way up. We find, therefore, that we wish to know what her mean is in order to get a proper conception of the case. This case has *moderate relaxation on straining and a tear of the cervix. The pelvic floor is not marked* We think the retrodisplacement accounts for the symptoms. I shall go ahead and do the retroversion after the repair of the cervix and pelvic floor.

Dr. Raymond C. Coburn

The effect of the gum glucose solution is to raise the blood-pressure on administration. The grade of the blood depends chiefly on its fall and the patient's reaction. If the patient is in pronounced shock, the rise will not be as pronounced as if the patient were in a better condition, but it produces a pronounced rise and that remains for several hours. If the patient is not in a too depressed condition, it is sufficient for a very bad condition of *shock to be tided over without further treatment*

In the Journal of the American Medical Association I have an article relating the effect gum glucose had in a very bad condition of shock. That record shows *absolutely* that the patient was in a desperate condition with a blood-pressure of 118/98 just before operation and a drop to 76/64 at the end of the operation, and pulse pressure of only 12 It is considered by the leading authorities that to have a systolic pressure of under 80 or a pulse pressure under 20 means that that patient *will die.* That is the standard pulse pressure record This patient had at the end of the operation a pulse pressure much under that, 76/64, giving not only a *systolic pressure much under 80, but a pulse pressure under 20.* About five minutes later, which was just the time the gum glucose was begun, the pressure was 74/64, that is, the systolic had fallen by 2 mm., making the pulse pressure only 10 At the end of one hour, which is the time required to administer the gum glucose solution at 4 c.c. per minute, the systolic pressure was raised from 74 to 100, the diastolic remaining about the same, giving the pulse a pressure of 40, showing the

increase to be four times as much blood-pressure circulating at the end of the hour as at the beginning. The gum glucose was finished at 6.05 in the evening, the record being 100/60 for the blood-pressure, and practically one hour later, 102/60. After twenty-two hours it was 170/60, and two hours later, 160/24, showing almost constant maintenance. At 8.30 the next morning it was 120/74, which is more than it was before the operation. I wish to emphasize that the standard condition of shock is recognized as a diastolic pressure under 80 or pulse pressure under 20 for a half-hour. This patient had a pulse pressure of only 10, or over 45/10, *and yet the reaction in this case is not particularly out of the ordinary. It is the usual effect of the gum glucose solution.* Of course, in some cases we do not have it so steadily maintained after it has become started.

Generally blood transfusion is given to supplement the gum glucose, and while it does not raise the blood-pressure as does gum glucose, it does maintain the patient's resistance and vitality. The nurse cannot give the patient the gum glucose—that is not a minor matter and should not be disregarded. It always tends to prevent the postoperative acidosis and answers better than any other postoperative administration.

DR. WARD: I understand a question has been asked about blood transfusion. In these cases of hemorrhage we give transfusion; certainly in cases of hemorrhage or anemia, where needed, we give the transfusion; but here we are talking of cases of shock without loss of blood, *i. e.*, shock just from trauma If at the same time the shock is brought about during the operation by additional loss of blood, we want to have blood transfusion. We do type the cases before operation, and we have a list of donors, and therefore we are going to get that donor as quick as we can, but cannot have a donor ready for every operation that we do, but we have to have the donors on call.

We have done these cases with gum glucose in this way for a record of over 1000 cases since 1919; 1000 cases of 6 per cent, gum glucose, without a mortality, shows that we have made a fair test of it; and we have the records showing the transfusion of blood and of gum glucose; and Dr. Farrar, who is operating, has

already presented a series of 400 to 500 cases, which have been published. I have passed around the report one of my fourth-year Cornell students made of a study of the gum glucose, which I think is enlightening. We are perfectly aware of the fact that the intravenous use of gum and glucose is not common, but in Canada they are using it all the time. If you go to Toronto you will see Starr giving it. The whole thing is that it got a bad name in the army during the war, owing to the fact that it was given under bad conditions and with solutions made up improperly, so the results, of course, were unsatisfactory. The way we do it the result is entirely different. A patient weighing 150 pounds is given 500 c.c of the solution at the rate of 4 c. c. to the minute, and prepared in this way is not the way it was given in the army hospitals. We are using it here in the Woman's Hospital almost daily.

DR. COBURN: Dr. Miller, an anesthetist in Providence, reported 1000 cases in which he used Moody's rule of the ability to stand operation. If that is 25 to 75 per cent. the patient is probably inoperable. Out of 1000 consecutive cases there was a death rate of 27 per cent., and in other cases, a death rate of over 20 per cent. Taking the deaths which occur at this hospital, following 1312 operations in one year, there was not a single death that occurred in the inoperable class that was due to a circulatory disturbance or pressure. That is a remarkable record. With a death rate of 20 per cent., in the probably inoperable cases, whereas in the hospital here there was no death in the probably inoperable class—not a single death that occurred from shock or any circulatory disturbance. The four deaths that did occur were several days after operation and were due to several other causes. These were:

1. Five days after operation, due to septicemia; the patient was having a severe pus infection.

2. The second case died twenty-eight days after operation of pulmonary hemorrhage (embolus).

3. Patient died ten days after operation, due to septicemia; toxic absorption following simple drainage.

4. Thirteen days after operation, bronchopneumonia; no connection.

That brings out quite clearly the difference in the result of maintaining good blood-pressure during the postoperative period. The death rate in this hospital during the past year was 1.68 per cent.

CURETTAGE AND EMMET TRACHELORRHAPHY AND REPAIR OF RECTAL FASCIA AND PELVIC FLOOR—DR. FARRAR. ON THE SAME PATIENT DR. WARD DID AN APPENDECTOMY BY THE SIMPSON METHOD AND OPERATION FOR RETROVERSION

DR. WARD: Dr. Farrar has dissected out the rectum just as I did, and put that through the undamaged part of the vagina. The undamaged part of the vagina has not been changed by the operation for the cure of the rectocele. While Dr. Farrar is closing the operation I will say a word or two about retroversion.

We teach the students of retrodisplacements, etc., that the patient can choose a truss for hernia or an operation. She can have it held up with a pessary, or have an operation to cure the condition. There are many operations for retroversion, as you know. However, we are strongly opposed to the use of the ventral suspension that Howard Kelly brought out, as we think it is a very uncertain procedure, forming an adhesion in the abdominal cavity; in that way we do not think it a good procedure. At one time, as you know, that was a very popular procedure, but we have sound reasons for not doing it, and do not think it a logical method. The ideal operation I follow is the one devised by Simpson. The round ligaments are shortened in the normal relation; they are shortened without being displaced from their position. The Alexander operation is all right, and is ideal, but we find that in a large proportion of the cases we wish to open the abdomen. There are so many cases in which we miss the pathology, and we think we do better for the patient in the average case if we can see inside the abdomen at the same time. It is often time-consuming. Then there is the operation which you are all familiar with, known as the Gilliam operation, which is wrong, we think (described it). That is again open to the objections of the other; you get some complications around the ligaments, and then they don't hold in the normal direction,

which is from the horn of the uterus to the internal foramen.
While it does lift a portion of the uterus, we don't like it. We
strongly deplore the use of the Gilliam operation for prolapse.
You know how the round ligament is pulled out, very long, and
you have a muscular structure in the round ligament, and it is
not intended to carry weight   Nature uses fascia   The round
ligaments are not intended to carry weight, and we do not think
it should be used

When we cure a prolapse in a woman, we prefer to reef the
broad ligaments, etc.   That is the plan we employ.   We have a
choice of operations, and are partial to the procedure used by
Charles Mayo.   The procedure which we use for retrodisplace-
ment is the shortening of the round ligament in its normal
direction from the uterus, to the foramen, using the strong portion
of the round ligament, and doing it all intraperitoneally.   We
have done that a number of times and are satisfied with it as an
operation.   The objection is if the woman is very stout.   We
have not had much satisfaction with the Clark operation.   Per-
sonally I have never cared for that operation as he does, although
I admit that if I had a case which is markedly denuded I would
do that operation; but my general procedure in an uncompli-
cated case is to do the Simpson operation.

We have tried to systematize our instrument trays   I have
showed you on the curetting tray how the instruments are
arranged so that they can be used in sequence all the time.
We have arranged the procedure in the same way so far as the
abdominal operation is concerned, and these little cuts which I
pass around will show the arrangement of the operative trays.
You can arrange them any way you like, to suit yourself; but it
is an excellent idea to have a definite way of having them on the
tray, and you will always find the instrument when you want it
So we have these standard trays, and you have the picture hung
up so that every nurse and intern can learn it   That cut may
interest you; we find it of great use; it relieves the suture nurse.
All the items that are used all the time are kept on the front row,
etc

This patient's blood-pressure is 115/85; just prior to opera-

tion ... 155/85, and ward pressure is 110/80. Since she has been through the operation thus far, her pressure has dropped, and she has now 115/85. The demonstration of using the apparatus of the transfusion will be shown by Dr. Ricci. We copy Dr. Clark, of Philadelphia, in the use of the "internal hot-water bottle"; he puts it in at the end of the operation, and puts a little oil in We put in 1½ quarts at 105° F., with a little bicarbonate of soda. We put it in at the end of the operation, as he does, but we put the liquid in lying down, and in that way, as we sew up the peritoneum, 1½ quarts run in up to the transverse colon; you have a hot-water bottle in and a good drink at the same time. The patients are very much less thirsty after taking up the quart and a half, and it gives them a good stimulant.

Now we put a sterile sheet over the patient in this way; place the standard between the legs, and if you have it absolutely square, as you must, you will have a good deal of satisfaction with it. You put it in place with the legs tied together; the simple retractor is not quite as satisfactory in my hands for pelvic work.

Suspension of Uterus.—These sketches are a very good guide for the incision. We open the abdomen. We don't want to run the danger of hernia, so we make a trap-door incision. The transverse incision is very pretty to look at.

The next picture shows you the fascia open to the left. You see the anatomic picture, showing the relation of the parts. The only postoperative hernia occurring on my division in six years was a case sewed up by the house surgeon who did not follow out the technic.

We pick up the sheath of the rectus muscle and dissect out the muscle from the sheath. Now we pick up the peritoneum. We open the peritoneum. Now we have the abdomen open. Before doing anything else, we protect the wound very carefully, and we do that with gauze, thus. I leave the flap in. I like to have the whole cut edge protected. There is a great difference in handling the viscera; the postoperative distress is in proportion to the way it is handled. We put a retractor in and lift up the screw and fasten it. We don't have to bother any more about

that; and we are now ready to put the pads in position   We throw the gut back without lifting   I am very partial to Dr. Bissell's pads with a Turkish towel inside, putting one pad on this side and one on the other.

Now we have it exposed, and you can see with that method you have a fixed retraction; you have no cut surfaces shown; you have the gut out of the way, and the heat in these pads is essential.   We take a look in there, and see what we find—a typical case of retrodisplacement.   Pick up the uterus with an instrument.   We use rubber-tip clamps with which we pick up the adnexa to inspect it.   That is a normal adnexa   Absolutely nothing wrong at all.   Looking on the other side we find a similar condition   She has very lax round ligaments   We start in by lifting the round ligament   There is the tube at one side   We pick out this ligament and put a suture in that way, and clamp it off   Now the other one is relaxed.   We pick it up by its middle and in the same way put a suture on that.   That is a strong ligament   Before we go on with that, we have to disarrange our method here and take a look at the appendix.

Here we have the appendix, and have demonstrated the shape. There are some adhesions there   We will take off the appendix The technic of appendectomy has been standardized; in this case we say appendectomy, and you can follow it out   Now we ligate the appendix.   Now we are ready for the purse-string suture.

We start with a purse-string suture and go through twice; turn, now go through twice and lock it, now take that up, so, and pick up again in a couple of places, and pull the needle off Note that this is the loose one; this is the tied one, between my front fingers; the loose one is a little longer.   Then with a split pad wrap it around the base and clamp the appendix, take a cautery and go half-way through, and then down into the stump Now I can pick up this and tip it, now tie and cut it   We tie the meso-appendix over against the cecum   After that, we will take a very careful look, to be sure there is no oozing   We happen to notice that there is a vessel there.   The next thing is to pass our hands to the upper abdomen and make a diagnosis, for the patient is entitled to a diagnosis.   The gall-bladder is

collapsed; there are no adhesions. The kidney has nothing wrong, and the other side has nothing there that I can feel. So I feel we have the benefit of a diagnosis that is certain.

Now we will do the Simpson operation for retroversion. So far we have not exposed the intestines unduly, and we have taken out the appendix.

You will observe that Dr. Simpson's pictures show first the Gilliam operation and how to divide the abdomen. Next, you will notice that this is a valuable picture to recall the anatomy to the students' minds—the large blood-vessels, and the danger therefore of attempting to do an operation that has a sharp-pointed instrument opening around the internal ring; therefore, Simpson's instrument is much better, and I would advise using it.

We take this round ligament and put it on the stretch, and look at the internal ring. With my finger on the internal ring, now I have it; first, prepare my round ligament, and I do it this way. I pull it out, put my finger on it, and with a fine pair of scissors take up the anterior ligament and make an opening in that. Now we have to prepare the round ligament. We keep back the edge of the rectus sheath; I have the peritoneum here, the fascia here, etc. Make a little nick about the center, and I am ready for Simpson's clamp. What I do, as you will see in the final picture, is to go through the rectus, right over to the internal ring, and come out through the peritoneum, and come out of the little hole, and pick up the round ligament with a suture. The essential is to leave the internal ring. I can see it; I can see the corner of my instrument. Now I open this instrument, and the doctor puts in the catgut and you will see it come out. There it comes. I use a broad thread of linen to sew. I have the round ligament and go through the fascia there, and tie it, so, and do the same on the other half.

I used to do a Simpson operation and anchor that loop on the upper side of the rectus fascia. We had several that were quite painful and so now we draw the round ligament back again between the rectus muscle and the sheath. We take the stitches through the fascia and through the loop underneath the sheath

against the muscle I shall follow the same procedure on the
other side

RADIOGRAPHY OF PELVIC CONDITIONS, ILLUSTRATING ESPE-
CIALLY ISTHMOSPASM OF THE FALLOPIAN TUBE

Dr. William T Kennedy

As you all know, Dr Rubin introduced three or four years
ago a method of determining whether the tubes were patent or
closed This method was carried out by passing carbon dioxid
through the cervix through a special cannula into the fundus, and
if the gas went through into the abdominal cavity at pressures
up to 100 mm , the tubes were declared patent. In pressures of
100 to 200 mm of mercury, some obstruction was observed in
the tubes If the tubes were occluded, it was a question of what
was the matter with them, and where was the trouble About
two and a half years ago I took some photographs of the tubes
by passing a 20 per cent. solution of sodium bromid in and
keeping at a pressure of 200 mm of mercury while the x-ray
photograph was taken

Here is the x-ray. This is the cannula, and this is the specu-
lum in the vagina. Here is the outline of the fundus of the uterus,
and here the outline of the tube hanging down in the culdesac,
and here is the tube on the other side, the ampulla of which is dis-
tended with sodium bromid at a pressure of 200 mm. of mercury.
The sodium bromid in the fundus is also at a pressure of 200 mm.
of mercury Between the cornu of the uterus and the ampulla
of the tube there is no sign of fluid in the isthmus. The isthmus
is able to contract. Its circular muscle has sufficient strength
to empty its contents into the uterus or into the tube against a
pressure of 200 mm of mercury. That led to another point.
Is there any time when the isthmus of the tube will not
admit the sodium bromide through its canal and still be per-
fectly normal? I want to show one or two cases to illustrate
what we find Here is the fundus of a uterus, comparatively
large, which is an indication of a pregnancy at some previous
time, and here is the isthmus of one tube, the canal extending
all the way down with the very dull shadow of the tube turned

down and backward into the culdesac This patient was operated on by Dr. Ward, and he found a hydrosalpinx of the tube. The hydrosalpinx was determined before the operation, because the sodium bromid did not give the shadow here as it did in the fundus, on account of the sodium bromid being diluted. On the other side the shadow of the tube was entirely absent.

Here is a most interesting case. Here is the fundus of the uterus turned forward, which is a typical shadow for an acute anteflexion. On the left side the isthmus of the tube shows all the way out to the ampulla, which was spread out over a large ovarian cyst This patient was also operated on On the right side the tube is entirely absent. What was the matter with this tube, for examination at operation showed the ampulla of the tube was entirely normal? There were no adhesions, but the sodium bromid did not get through the isthmus. The tube was resected, and a good wedge was taken out of the cornu of the uterus. The whole tube was serially sectioned, and to my astonishment we found nothing but a normal tube. In other words, here was a tube which had no pathology, and yet the sodium bromid did not go through it. What is the explanation of a normal tube that sodium bromid will not go through? Here is the next step: You see here an infantile uterus which had the left tube removed at a previous operation. Here is the peculiar shadow of the right tube with the fimbria in the culdesac, but again there is no isthmus showing in the picture. The circular muscles are unable to contract down and empty all the fluid out. As a matter of fact, in this type of tube, where the isthmus does not show in the picture, each patient had a dysmenorrhea accompanied by sterility. A similar picture shows very distinctly a uterus which is moderately anteflexed, the ampulla of the tube on the right side showing, but absolutely no isthmus. Again, this patient had a dysmenorrhea. We went on to look for the cause of an obstruction in an apparently normal tube that contracts down and forces all its contents out. I was led to go a step further where we have normal anatomy and where we get a stenosis of a spasm, that is, at the pylorus. We know that

pylorospasm can exist, and yet we can have normal anatomy
(except sometimes a typical stenosis where the pylorus is
thickened). In pylorospasm we have a hyperactivity of the
vagus over the *sympathetic* which makes the circular muscle
contract down, thereby preventing the stomach-contents from
going through In studying the physiology of the nervous
system, I find that the circular muscle of the isthmus is also
controlled by the autonomic, while the longitudinal muscle of the
isthmus is controlled by the sympathetic, so that we have, then,
analogous conditions in the pylorus and in the isthmus of the
tube We may then say that we have an isthmus spasm or
isthmospasm in a perfectly normal tube as far as anatomy is
concerned. Have we ever seen these two conditions in the same
patient? Dr. Miller, of New Orleans, has shown that the vomit-
ing of pregnancy is many times a simple pylorospasm. Within
the last few weeks I have found a patient in the third month of
pregnancy with both uterine contractions and a pylorospasm
which have remained cleared up to the present with doses of
atropin three times a day

RADIUM FOR CARCINOMA OF THE CERVIX; OPERATION

Dr Lilian K P Farrar

We had some of these cases of carcinoma of the cervix come
back on Wednesday, which were approaching the five-year
period. The statistics of the Stockholm Clinic have been ex-
tremely interesting, because they hold the best record of results
in radium treatment. Yesterday at a conference of the Congress
of Surgeons I had the pleasure of listening to the latest statistics
given by Dr. Heyman, and if I give them right, I think it is 20
per cent plus that have gone for five years cancer free The
advantage in Stockholm is that they have a 100 per cent follow-
up. The Government will send the patients back to be checked
up. In New York we have great difficulty with follow-up work
We have 78 per cent. follow-up on the cases we see here Dr
Ricci, in looking up the cases for the College of Surgeons last
January, found that in 67 cases of carcinoma of the cervix 13 were
alive at the end of three and a half and four years, and they are

now approaching the five-year period. We have, therefore, 19 per cent. and I hope we may some time equal the Stockholm records.

We give usually a single dose of 2400 milligram hours of radium salt. Then we wait six to eight weeks, and see what the result of that is. It depends on the result when we give the next dose. That is our routine and we vary from it only when we find extensive carcinomatous involvement in young women. Then we increase the dose. We have cases that have come back for one, two, three, and sometimes four radium treatments, but the usual treatment is one dose of 2400 milligram hours of radium salt placed in the cervix. The radium is in glass, hermetically sealed, and then in a silver tube. The silver tube is then placed in 1-millimeter brass tube. These brass tubes are of a different length—according to whether we want radium in a long tube for myomata of the fundus uteri, or in a small tube for carcinoma of the cervix. This brass tube is then enclosed in a rubber tube which is used to protect the brass from the secretions, and the end of the rubber is tied with linen. One thread is left long, and that is for the reason that we suture this in the cervix to hold the radium just where we want it. We keep the linen taut while we are packing the vagina, and then tie it to the skin of the vulva. It means that the patient cannot get up and walk around and lose it out, which has happened in other hospitals. We consider the way that we pack to be of great importance. Every case is given anesthesia, not only because of the difficulty of putting the radium into the cervix, but the difficulty of packing the vagina tightly. The lower bowel is emptied by an enema, and the patient is catheterized. The cervix is packed with narrow gauze, and tied to wider gauze, which is packed in the vagina just as tightly as possible. We tie the gauze to the radium, so that if one comes out the other has got to come out. We started putting a mushroom catheter into the bladder because we found that in packing the vagina tightly the nurses had difficulty in catheterizing the patients. We put a catheter into the bladder to save the interns being called up in the night, and found it saved the patients also by keeping the

bladder collapsed   Patients have nausea while the radium is in,
but no prolonged vomiting and no vesical irritability.   They
have a discharge which is nothing but a contracting and healing
of necrotic tissue.   The patients sit up quickly, usually in
forty-eight hours, and are out of bed the next day   In this way
they appear to avoid the toxic effects from the broken-down
tissue, and will not absorb it.   We tell them that they must take
a daily douche.   We urge them to come back once a month on
the follow-up day and urge them to be out-of-doors as much as
possible and try to gain in weight.

HYSTERECTOMY FOR FIBROMYOMA UTERI

Dr. George Gray Ward

The patient is a negress, with a large multiple fibroid, the
main point being that she is anemic, though she has not had
hemorrhages   Her hemoglobin has been down to 48 and her
red cells are low   This morning she had a prophylactic blood
transfusion of 500 c c. before operation.   The work of Gatch and
Little in Indianapolis is interesting.   They have made studies
of the amount of blood lost at operation   In an ordinary hyster-
ectomy it is not unusual for the patient to lose 300 or 400 c c of
blood   If the woman is anemic you will appreciate that if this
amount of blood is lost it will be a serious factor in lowering her
resistance   We think that the thing to do is to fortify them
against blood loss by giving a blood transfusion first, instead of
afterward as a desperate resort.

The patient is fifty-two years old, married.   Her chief com-
plaint is a lump in the lower abdomen, of eight years' duration.
Her family history is negative   She has been married fifteen
years and has had five full-term normal pregnancies, no mis-
carriages   She has had no operations and no previous ill-
nesses   Her menstrual history is unaltered.   She has had a
slight discharge after periods, but no pain, backache, or hemor-
rhage   The lump in the abdomen has recently become larger.
Her general health is excellent and examination reveals a well-
nourished patient.   Heart and lungs are negative   Urine is

negative. Red cells, 3,400,000; hemoglobin, 48 per cent.; white blood-cells, 12,000; polymorphonuclear leukocytes, 79 per cent.

Operation.—The first slit is made through the skin in the midline and I am opening the rectus sheath. We dissect the rectus muscle out of its sheath and displace it to one side. We make an extramuscular incision. When we sew it up we reverse the order, putting the rectus muscle into the sheath. Our technic is to cover the incision completely. We put in our protection here so that we shall not have any manipulation of the raw surface. The steps of the hysterectomy, as we do it, are illustrated on the slides. We do not like to use the extreme Trendelenburg position. We use rubber pads containing some hot Turkish toweling. The warmth soaks up any fluid, and the rubber is much less harsh on the intestinal peritoneum than is gauze. We put one on one side and one on the other, thus blocking off the pelvis. We believe the heat quite valuable.

We commence usually by taking hold of the round ligament with a clamp and cutting it off. This woman is fifty-two and does not need her organs, and so we shall not try to save them. If she were forty-two we would save the ovaries. I know that forty-two is not very far off from the time of the menopause, but we still think it of distinct value to save the ovaries. The next step is to get the bladder out of the way. There is one very large blood-vessel between the bladder and the cervix which bleeds readily, and so we must put a ligature on that. Now we are ready for the uterus. I have the cervix under my hand. In a specimen like this we like to have the pathologist's opinion.[1] We now have everything clamped and I will get the fibroid away. We have previously injected the uterus with iodin so that we have a fairly safe field to cut in. You can see the stump which has been injected with iodin. We have simply to control the bleeding, most of which comes from the tumor itself. It is very

[1] *Pathologist* (Dr. Plaut): I am astonished to hear from the history that the patient was not bleeding. It is remarkable to see a large, very soft polyp in a uterus and to find no history of irregular bleeding. The specimen is typical of a myoma of the uterus. Most of the myomata are intramuscular and have more tendency to grow inward than outward. There is no increase in connective tissue and no question of malignancy.

vascular. We like to dissect out the mucosa as far as we can. In ligating the uterus we like to go through the site of the cervix and we always put in our sutures as a mattress-suture. The tissue here is quite soft; the blood-vessels are in it and we desire to tie them against a firm resistant surface.

In the rest of the technic we ligate the round ligaments and we are now ligating the pelvic, always with mattress-sutures. We put the suture on one ligament and go carefully through the pedicle, bringing it over so that it goes right through the round ligament. Then we go through the stump, drawing the round and infundibular pelvic ligaments against it, fastening these down against the stump The infundibular pelvic ligament, you will see, is drawn right against the round ligament, holding it down with proper tension This gives a very good support to the cervical stump. The amount of blood she has lost I do not think equals a part of what we put in her

There are great advantages in not having to have people hold retractors. They have all their hands to help you. In closing up we shall simply go through the procedure we always follow. We have these procedures standardized, so that when we dictate the operations we say appendectomy, standard technic. The next step here is to put a ligature around the stump of the appendix, fix a purse-string suture in a definite way, start at the meso-appendix and go through twice at that point, locking it This ligates the vessel running into the appendix. We then pick up the bowel in two places, put the lower strand through our little finger like that, and again pick up the bowel in two places We make a careful inspection here. everything is dry and we have not handled the bowel grossly. The gall-bladder is negative. I feel the pylorus and both kidneys, which are apparently perfectly negative. We spread out the omentum, covering the parts carefully, and now we are ready for closing.

I do not know whether or not you noticed that the operating room nurse just now gave this patient a rectal injection of 1½ quarts of saline solution, with soda bicarbonate, at a temperature of 105° F., which Dr. John Clark calls his "internal hot-water bottle." We put a rectal tube into the patient before

she comes in. There is then no question that the water goes in. If you have the tube beyond the sphincter it will fill up easily. It is heat applied at the right place and at the right time. This we do as a routine here. I do not know whether you noticed the operating tray. We have the instruments arranged on the tray in a definite form, so that the instruments we commonly work with—scissors, thumb forceps, artery clamps, etc.—are arranged in a special form. All the nurse does is to keep the tray straightened out. If I take up an artery clamp, she is watching, and picks one from the discard which she puts in its place.

WATKIN'S OPERATION FOR COMPLETE PROLAPSE OF UTERUS
Dr. George Gray Ward

The next case is a plastic one and we are doing it under spinal anesthesia, which we use here when we find it to be indicated. We do not use it as a routine, but if there is a contraindication for general anesthesia, in cases, for instance, having high blood-pressure as in the present case, we use it. Dr. Labat is on our staff and gives the anesthesia whenever we wish it. You cannot all see this anesthesia given, and so while it is being administered outside I shall speak about transfusions here. We formerly used the citrate method and it was a very valuable method, because anyone giving intravenous saline can give them, but we believe we have fewer reactions and have a better procedure when the blood is given directly from donor to recipient. This Unger apparatus is extremely simple. Here is a two-way valve. As the piston of the syringe is withdrawn, it withdraws the blood from the donor and passes it into the recipient. Saline is run in part of the time. We have given blood transfusions here frequently in the last two years—namely, 282. That is a fairly large proportion because the cases have not been desperate. Almost 50 per cent. of them were prophylactic. In the case from which I just removed the fibroid, the patient was given a prophylactic blood transfusion of 500 c.c. In some of the plastic operations there is constant oozing and few realize how much blood is lost. Gatch and Little collected the sponges used and washed them out. By the colorimetric method they were able to estimate the

amount of blood lost, showing that there was a loss of 300 c.c. in the ordinary hysterectomy, and in a nephrectomy 800 c.c. That is quite a considerable amount to add to an already debilitated patient.

The patient on whom we are now going to operate is a woman fifty-five years old. Her family history is negative. Her
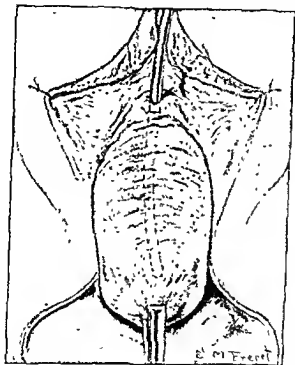
Fig 234.—Cystocele (hernia of the bladder) demonstrated with a sound in the bladder showing its relations to the cervix and vagina.

menstrual history is as follows: began at fourteen, occurred every twenty-eight days, lasting four days, menopause, 1918. Two pregancies, one full term, thirty years ago, and one miscarriage. Laceration, no repair. She has been troubled with frequent micturition. She wears a ring pessary Otherwise her history is negative. Her blood-pressure is 174/100. Pulse pressure, 74 Physical examination reveals a large cystocele,

and a partial prolapse, about one and a half degrees. Her urine is negative. Red blood-cells 4,600,000, hemoglobin 78 per cent., white blood-cells 10,500. Wassermann negative. The patient has an increase of blood-pressure. She has quite a pronounced cystocele. It is not an extreme case of prolapse, but she suffers considerably from the displacement of her bladder and she is well past the menopause. We make the division as to whether patients are in the child-bearing group or whether they are not. If they are, we try to put the parts back as normally as possible. But if they have a procidentia of extreme degree, where the uterus can easily be taken out, we are disposed to do so and sew the broad ligaments together, as suggested by Dr. Charles Mayo, previously having separated the bladder from the vagina and the uterus. That operation has been very satisfactory in cases of complete procidentia, and makes almost a cure of the bladder condition. If we find in association with this a deep culdesac of Douglas and an enterocele, we try to dissect out the peritoneal pouch and unite the intersacrals as high as we can with sutures, to obliterate the pouch, and then do a repair of the pelvic floor. If the uterus is not complete outside, and is perfectly healthy, we are inclined to do the operation of Watkins, of Chicago, interposing the uterus itself underneath the bladder. This is a very much less severe operation than the Mayo operation. We do not do this on cases of complete prolapse. In this particular case I am not quite sure which procedure I shall use. We had scheduled an operation of the complete Mayo type in another patient, but the patient has a temperature and it is impossible to operate on her. I called in this case because it was the next one available of this type.

I will ask Dr. Labat at this point to say a few words on spinal anesthesia.

SPINAL ANESTHESIA

Dr. Gaston Labat

The dose of novocain injected intraspinally is usually rated at 1 centigram per 5 kilograms of the body weight of the patient. Other doses have been tried, but the results are not encouraging. Greater doses produce toxic symptoms in a few

cases, and if they are materially decreased they do not produce anesthesia of sufficiently long duration. In this case 12 centigrams of pure neocain were used, representing 1 centigram per 15 pounds of the body weight of the patient ($12 \times 15 = 180$, which is the minimum weight of the patient under consideration). The injection was made between the first and second lumbar vertebræ so as to produce anesthesia of the lower half of the body.
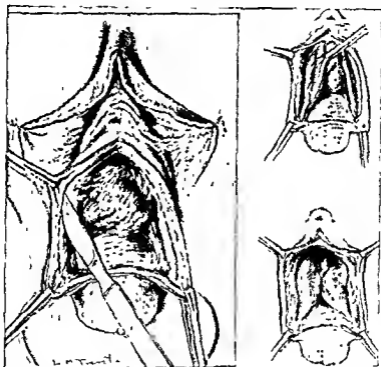
Fig 235 —The vaginal wall opened with a T-shaped incision, exposing the bladder The method of dissecting the uteropubic fascial plane from the vaginal wall, leaving it attached to the bladder, which is pushed upward and the peritoneum opened

Neocain is a French preparation, sterile, accurately dosed, and put up in sealed ampules The solution is made with the cerebrospinal fluid of the patient obtained directly from the spinal puncture needle. The fluid is allowed to drop into the ampule, the solution being thus extemporaneously made We

make it a rule not to inject any foreign solution in the sub-arachnoid space. Immediately after an injection the patient is placed in a slight Trendelenburg position. The duration of spinal anesthesia is ordinarily from one to one and a half hours for operations on the pelvic organs. Manipulations on the
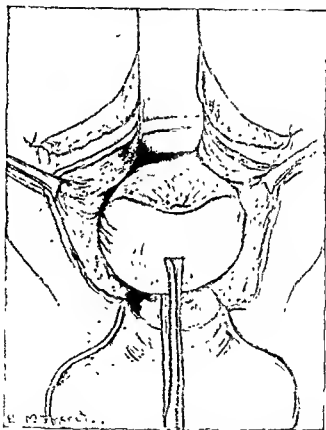
Fig. 236.—The fundus of the uterus is delivered, the bladder has disappeared up into the pelvis, and rests on the posterior surface of the uterus. The peritoneal reflection attached to the bladder is sutured to the fundus, thus closing the abdominal cavity.

uterus are painless during the first hour, whereas the vagina and the perineum remain anesthetized for an hour and a half.

QUESTION: Are you using the sacral method?

DR. LABAT: Yes, but when the thickness of the soft structures covering the sacral region conceals the landmarks in such a way as to prevent reaching them with any accuracy, it is preferable

to use the spinal method which is more easily accomplished and
serves the same purpose The puncture of the spinal canal in
fat patients is not very easy. It therefore requires considerable
skill to puncture ten foramina in the sacral region when the
superficial landmarks cannot be taken with sufficient accuracy.
In lean patients, where the landmarks are accessible, sacral
anesthesia gives perfect results
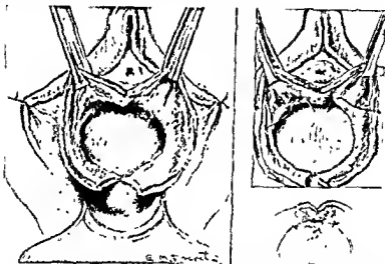
Fig 237 —The fundus of the uterus is fastened with a suture to either
side of the subpubic arch, care being taken that the suture includes the peri-
osteum A third suture is placed as shown to close the space in the midline

Dr. George Gray Ward

The procedure we shall do will be that of Dr. Watkins. The
first thing to do is to separate the vaginal mucosa and slit down
the fascia. You see we have not disturbed the fascial relations.
We pick up the end of the vagina and take our scalpel as Watkins
does to loosen the fascia We have to push it back. We have
to do the same thing on the other side. Here is the bladder
fairly well loosened from the vagina except at the lower end
The bladder will push up quite readily. On palpating the
adnexæ on either side they are entirely negative We wish to
deliver the uterus. I could do a Mayo operation, but I do not

satisfactory result and I am quite sure that she will not have a recurrence of her bladder coming down. We put in a rubber drain. In case there is a tendency for a collection of blood to occur, it can easily find an exit We remove the drain on the second day after operation. The next step is the sewing up of the vault. We do a rectopexy as well as a perineorrhaphy. This is a small rectocele and here is the fascia covering the rectum.
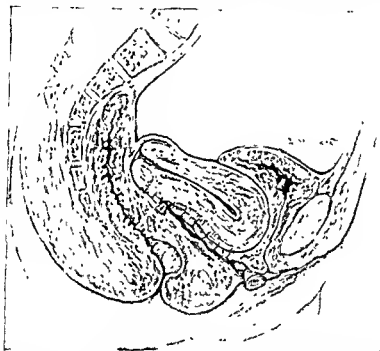
Fig. 239.—Sagittal section showing the relation of the uterus, the bladder, and vagina with rubber tissue drain in situ at the completion of the operation

You have the same fascia here as in the vagina and also in the pouch between the gut and the vaginal structure itself, which is damaged down below. I pick that up and there is the rectopexy support This presses the rectum right up to the undamaged part of the vagina. The next step is an essential part of the operation. We take hold of the muscle on one side with the index-finger I always like to use a transverse slit in the vagina.

This is the lower jaw that closes against the upper jaw. After we have shut that mouth we are very particular to suture the fascia carefully. That has a great deal to do with the stability of the operation. I am now ready to close the mucous membrane and finish the operation.

FOLLOW-UP CLINIC; CASES OF CARCINOMA OF THE CERVIX TREATED BY RADIUM

Dr. George Gray Ward

We shall now show you some of our radium cases illustrating the results of radium treatment as applied in this hospital. As you know, we are all in a very receptive mood so far as what we can do with radium. We know we can do some very wonderful things with it. We know, of course, that there are decided limitations as to what we can do with it, depending entirely upon the type of case. We have quite a few patients here to show you and I will give you their stories from the follow-up cards.

The first case is one that came to us in May, 1922, a woman thirty-four years of age who had been bleeding periodically for a year. Our examination showed a carcinoma of the cervix which was absolutely inoperable, so that she was put in what we call Class III, Schmidt's classification, Class I being the extremely early type; Class II involving practically all the cervix, Class III involving broad ligaments; Class IV involving the entire pelvis, and Class V including recurrences. The patient was a Class III case, inoperable outside the cervix, and the condition such that we could treat her only with radium. She had a tube of 100 mg. of radium inserted into the cervix for twenty-four hours, with a very satisfactory result. The bleeding disappeared, everything cleared up, and she was well until March, 1924. On February 13th the patient said that she had never felt better in her life. Examination showed a cervix free from carcinoma. She was advised to return in a month. In March she said that she had been bleeding for thirteen days, but otherwise felt well. Examination revealed a small bleeding area at the site of the contracted cervix and she was advised to re-enter the hospital for observation. The findings were a cervix very much contracted, clinically free

from carcinoma. There was an escape of a considerable amount of black fluid. The contraction of the cervical canal had prevented its escape. It is possible that the patient had been pregnant, but the appearance were not those of a miscarriage. The uterus was washed out and 100 mg of radium inserted into the canal for nineteen hours. This was done last March. We have here today a patient in excellent condition, and clinically free from carcinoma.

The second case is a case completely destroyed and you can all see her condition. Our standard treatment is 2400 milligram hours in each case. In those in which the broad ligaments are involved, that is in Class III, after the radium treatment we give x-ray treatment in cross-fire, in front and behind. We give a series of four or five treatments, and then another treatment six or seven weeks later. There was nothing remarkable in the present case, except that she was in a very bad condition when we first saw her and you see now the remarkable change that has occurred. The patient was fifty-three years old when she first came, in 1920. She was seen at the Follow-up Clinic in March, 1924, four years later, and she is now in her fifth year. She first had a carcinoma of the cervix, Class IV. Examination showed a cauliflower-like growth involving the entire cervix and extending to the posterior vaginal wall, as thickening was felt there. The uterus was partially fixed. She had gone much further than the first case had.

A specimen is removed in all cases for examination, and in this case the diagnosis on microscopic examination was a solid carcinoma of the cervix. She had also a four plus Wassermann. On March 16, 1920 she had 100 mg. of radium placed in the cervix for twenty-four hours. She has had only that one treatment. The last follow-up in July says the patient has no complaint. There is no bleeding and no discharge, or other symptoms. Examination shows no evidence of disease. This is a remarkable story when we realize what it was in the old days. She has gone four and a half years with one treatment of radium for 2400 milligram hours. As I said, a pathologic examination is made on every case. We do not count any case unless we have

the pathologist's report. This is one of the cases that is remarkable. At that time we were not using combined x-ray treatment. It is true that the type of carcinoma in this case was of that exuberant cauliflower-like growth which we know yields best and most readily to radium.

QUESTION: Why did you start the x-ray treatment?

DR. WARD: Because of the work at the Memorial Hospital. Did you read Dr. Bailey's and Dr. Healy's paper that they presented in Chicago? I had to discuss that paper, and they apparently had a large series of cases with all the radium they needed. They have abandoned radium on the outside and use the ordinary Coolidge tube radiation. They do not give large treatments, but small doses, repeating them in the course of six weeks.

When this patient has gone six months more she will be in the five-year period, but we have cases which have gone five years and have then showed metastases, and so I am not willing to agree that the five-year period is the safety line. We have had recurrences in the six-year period. I recall one case especially, a case that I saw a number of years ago, before we had radium. It was a Class III carcinoma of the cervix on which I did a real Wertheim operation, which means according to the technic developed a number of years ago by Wertheim of Vienna, of removing the broad ligaments and the upper third of the vagina, keeping the cervix completely closed and cleaning out the glands along the iliacs. That case was well for five years. She sent me a Christmas card each Christmas, but the sixth Christmas card did not come. At the end of the sixth year she had developed metastases in the sacral bones and was in this hospital then. The metastases had the usual result.

The third case is one of our star patients. She was first seen November 11, 1919, five years ago this month. She had a carcinoma of the cervix, Class III. It had gone macroscopically outside the cervix and the broad ligaments. The pathologic diagnosis was cylindric-cell carcinoma. She had 100 mg. of radium for twenty-four hours. She made a remarkable improvement and seemed perfectly well. On April 6, 1921, some time after her original radium treatment, she had gained 10 pounds within three

months and felt in perfect condition. She had some discomfort and urination at night twice. Examination showed the pelvis and vagina negative. I sent her back into the hospital because she had such a good result. The uterus was so freely movable that I thought of getting rid of the uterus and at that time considered both radium and the operation combined. She returned to the hospital in January, 1920, and I did a real Wertheim operation. She had had radium in November, 1919. The pathologic report of the specimen removed was carcinoma of the cervix with minute remnants of carcinoma showing after the radium treatment There were still some cells there and so I am glad that I got it out. She made a very good recovery and has been well since. She returned in August, 1923, with a small nodule on the anterior vaginal wall which she had noticed in June. We were suspicious and I sent her into the hospital on July 19, 1922. I slipped two radium needles in the nodule. We cleared that up. She has had nothing since except two white spots; that is all you are able to see now. She weighs 153 pounds and feels perfectly well. You will see a very much shortened vagina due to the effect of the Wertheim operation.

QUESTION: What is your view on operations for carcinoma of the cervix?

DR. WARD: I have come more and more to the position which Dr. John Clark, of the University of Pennsylvania, takes—that you can accomplish as much with radium as you can with an operation, without anything like the initial mortality. If we can, certainly radium is the one thing to use. Clark's statistics show that he has just as many cases alive after five years with radium alone, as he had when he did operations. Therefore, we must pay attention to that. It is still a debatable question as to whether radium plus operation is the best thing to do In this particular case the uterus was so easy to take out and as it was a very early carcinoma, I felt safer after having got it out, but I am in a receptive mood. You see the other case went four years and we did no operation If we can get away from doing this very serious operation—and a real Wertheim is a serious operation—we are inclined to abandon it. In early cases if you have an easy

uterus to remove it is not a bad scheme   The question is brought
up that there may be in the broad ligament certain cells that are
encapsulated that you may light up while operating and that
there is danger from it.   That is a debatable question   I know
Dr. Taylor thinks that radium and operation are the best proposi-
tion, but I cannot get away from what Dr. Clark is doing and
what the Memorial Hospital is showing.   They are running large
series with all types, and with this latest report of Bailey and
Healey it appears that radium alone and subsequent x-rays have
given excellent results.   The fundus uteri cases are operable
every time.   That is a different proposition.   We are talking
about carcinoma of the cervix entirely.   Carcinoma of the
fundus is always operable and you do an ordinary panhysterec-
tomy and 75 to 80 per cent. of that type of case gives pretty good
results.   Radium alone for carcinoma of the fundus is uncertain,
because if the carcinoma is of any size you cannot be sure that
the rays have gone into the triangular horn and have destroyed
everything.   You are taking chances on that.   We frequently
make a diagnosis at the curettage and slip radium in, then take
the uterus out afterward.

QUESTION: When do you use radium in the canal and when
do you use the needles?

DR. WARD: We always use it in the cervix with a carcinoma,
while the needles are put into the broad ligaments at the same
time.

The fourth case is one of Class III.   She came in last January.
Her metrorrhagia started in January.   There was a carcinoma in-
volving almost the entire cervix.   She had a piece of tissue taken
out for diagnosis, which showed a spindle-cell type with pearls and
one large area without pearls, that is, a mixed-type carcinoma.
She had 100 mg. of radium for twenty-four hours, plus four
needles into the broad ligament.   This was done last March.
The case is quite recent and I am showing it to you because of
the immediate result.   We knew the prognosis was poor.   She
weighed 200 pounds and has gained 30 pounds since this radiation.
The well-being is very apparent afterward.   You understand
that this is a comparatively recent case.   We had to put needles

into the ligaments and the condition was very extensive. There is no gross evidence of tumor.

It seems to me that when you see case after case with these results it is impossible for anybody to dispute the advantage of this method of treatment. Yet it is strange that there are still some skeptics who want to operate whenever they find a carcinoma of the cervix.

I do not wish to weary you with showing case after case, but I think it is important to emphasize the fact that there is a great deal more to the specialty of gynecology than cutting and sewing. You know, of course, that gynecology has been attacked in recent years. It is supposed to be a superfluous specialty. The general surgeon does it all. You can cut out the orthopedic man and the general surgeon can do all that work; but there is much more to gynecology than to other specialties when you come to the study of these cases. Think of the endocrinology. The general surgeon will not bother with that. All he can do is to cut out the ovaries. He has not the time to study this pelvic work. I think it is foolish to talk about the passing of the endocrinologist. Take the biochemical side. There is no end of work to do there. The cutting and sewing is the minor part. Gynecology is the study of woman as a whole, and so long as we continue to do this there is plenty of justification for us to struggle along in spite of those who decry there is no more need for us.

The fifth patient is forty-three years old. She is a Class II case who came to us first in April, 1923. The pathologic diagnosis was an epidermoid carcinoma. The findings showed a uterus normal in size. The cervix was the site of a large carcinoma extending posteriorly to the rectum, apparently not involving the rectal mucosa. She had a standard radium treatment of 100 mg. for twenty-four hours and four needles inserted into the lateral wall of the cervix. After a year and a half the patient states that she is absolutely without pain and has gained in weight. She has no bleeding.

The sixth case is one of a different type. This was one that another physician had charge of. She had a nodule in the posterior vaginal wall in the rectovaginal septum. In December,

1923, the doctor excised the tumor from the vaginal wall. The diagnosis was squamous-celled carcinoma of the rectovaginal septum. He had a failure of union because he used the cautery on the margins, and naturally got a slough that would not heal. The case was turned over to me to see what I could do with it, and having this positive diagnosis of carcinoma. There was still a nodule there, and so we put in four needles, slantingly, on the posterior vaginal wall. This was done in December, 1923. We were surprised to get a very satisfactory result. This was a case that we were worried about. If it had not been originally operated on I should have felt better.

Case VII is one that came in in March, 1920, and not a carcinoma at all. She had a fibroid uterus which was the size of a grapefruit. She had radiation in the interior of the uterus of 100 mg. Her hemoglobin was 27 per cent. and the red blood-cells 2,840,000. She was transfused. She came in later with another hemorrhage in 1921, and came for further radiation. We used two tubes of 50 mg. each, tandem, placed in for fifteen hours. There has been no more bleeding since. She was rather young in age, thirty, but we had to do it. The uterus shows degeneration and is a very edematous fibroid type. It has been a perfect cure, but of, course, it has also removed her menstrual function. We do not like to use radium in young women on this account. We prefer the operation, but could not do it on her. The last examination showed the uterus normal in size. If we have a large uterus we prefer to use one tube above the other, because we have the inner surface to radiate in a myoma of that kind. We think the x-ray is nothing like as satisfactory in cases within reach of radium. You cannot use radium in pedunculated fibroid and we do not like to use radium in sloughing or polypoid fibroids. We get absorption sometimes.

The next patient is forty-five years old and came in in 1922, with a Class III carcinoma. She had the usual 2400 miligram hours' treatment plus four needles. She had her first treatment on November 21st and on March 24th a second treatment of 100 mg. plus four needles. She has had two radiations with four needles because we were suspicious of a recurrence. We watched

her closely and when she did not clear up sent her in again. Three radiations are the maximum

This speculum that I am using is rather a fad of mine. I had a little sleeve put in so that you can clip it in and slip it out.

The last patient is a good-natured Irish woman who has co-operated with us. I wish especially to show you this case, because she is the most remarkable case we have. She came to us on June 28, 1919. She had an inoperable carcinoma of the *cervix*. She was forty-one years old at that time. She received 100 mg. of radium for twenty-four hours in the standard way. She had benefit from it because in October she had no bleeding or pain. Examination showed a remarkable result at the site of the cervix. She came back with a recurrence. She received a second radiation December 6, 1919. The result was beneficial at first because in February she had no bleeding, but had considerable pain in the rectum at the time of movements. In March, 1920 she had a hemorrhage. Examination showed a thick collar She came in again and had three treatments altogether. The credit for this is entirely due to Dr Farrar, because when she came back I felt that we could not do anything more for her with radium, and Dr. Farrar said, "Let's give her one more," and we did. On March 16, 1920 the patient states that she was in "the House of Calvary," which is a Roman Catholic institution for dying carcinoma cases. The patient weighed, before she came in to us, 227 pounds. In the House of Calvary she weighed less than 100 pounds. She had a vesicovaginal and a rectovaginal fistula, with all the discomfort that goes with them. She has had no more radiation. Much to our astonishment she walked in here weighing 232 pounds, with all evidence of disease gone. The rectovaginal fistula had healed itself. The vesicovaginal fistula healed well, except where it is very high up. When the bladder is full, it runs over and leaks. If it is kept fairly empty the patient is comfortable. If her urine becomes alkaline, she gets a phosphate deposit and then has trouble. She has been in the hospital with the phosphate deposit and we put her on a diet, making the urine acid, and she clears up. We can find no evidence of disease. I have been asked why

we do not close the fistula. The patient weighs 232 pounds and is very stout. It would be a severe operation to do because the fistula is extremely high and inaccessible It would mean a great deal of trauma and I am afraid, so far as the fistula is concerned, the operation might light up some dormant cells. This is 1924, and the patient came to us in July, 1919. That is over five years ago. There is no bleeding and nothing but the urinary distress. If she keeps the urine acid she will be fairly comfortable.

ORTHOPEDICS IN GYNECOLOGY

Dr. Frederick J. Matthews

The Orthopedic Clinic at the Woman's Hospital was started in 1920 to co-operate with the gynecologic departments of the Hospital in the treatment of patients suffering from backache, where the correction of the gynecologic condition did not give complete relief. All cases are referred from the gynecologic and obstetric departments to the orthopedic department, and, when necessary, patients are under treatment in two or more departments.

Women patients who have an orthopedic condition in conjunction with a malposition of the pelvic viscera give a history of two distinct kinds of backache.

The chief causes of backache found in the patients in this clinic are:

1. Subluxation of the sacro-iliac joint.
2. Relaxation of the abdominal muscles with ptosis of the abdominal viscera.
3. Muscle strain.
4. Contracted muscles of the back of the thighs and legs.
5. Abnormal conditions of the feet.
6. Scoliosis with rotation of the bodies of the vertebra.

1. Sacro-iliac subluxation is the most common cause of backache in the patients in this clinic. The usual variety gives a history of pain in one side of the sacro-iliac region following some muscular strain or after childbirth. This pain is often accompanied by attacks of sciatic irritation. Others have pain across

the lumbosacral region or in the middle of the back in the region of the fifth lumbar vertebra. Reduction of the subluxation often gives immediate relief, but these patients require good pelvic support to prevent recurrence.

2. Relaxation of the abdominal muscles with ptosis causes backache in the lumbar region, not localized, and is found in very stout women mostly. Support of the abdomen with a strong corset reinforced in the back gives relief to those patients.

3 Muscle strain might also be called occupational, as most of these patients do a great deal of heavy work and most of it in the stooped position, as washing and scrubbing. Massage and a good back support relieve the backache in these cases.

4 Contracted muscles of the back of the thighs and legs give a variety of symptoms, most of which are aching of the entire back and back of the neck, aching of the lumbar muscles, low occipital headache, cramping in the muscles of the calves of the thighs. These symptoms appear to be directly related to the amount of standing the patient has to do, and are usually relieved on sitting or lying down. These patients complain of being very tired on the least exertion, especially standing.

5. Weakened and fallen arches are a frequent cause of backache, and this is easily relieved by correcting the balance and giving a comfortable and proper support to the feet.

6 Scoliosis with rotation causes pain in the back, but this is unilateral and in the region of the curvature and is due to nerve pressure Most of these cases are too old to do very much for in the way of straightening, but can be helped by any strong support that will diminish the nerve pressure

Osteo-arthritis is a very frequent complication of some of the above conditions, and this makes the treatment more difficult. These patients are referred to the special departments to ascertain the source of infection and then return to the orthopedic clinic for treatment after the cause of the arthritis is cleared up.

This department takes care of over 30 patients on some clinic days, and we have two masseuses who give free treatment to all cases that require massage.

CLINIC AT PRESBYTERIAN HOSPITAL

HEMORRHAGE FROM GASTRIC AND DUODENAL ULCER

Dr. Whipple: In discussing the surgery of the stomach and duodenum we wish to present, first, the subject of bleeding ulcer, both from the pathologic and surgical points of view. Dr Von Glahn, Dr. Stout, and Dr. St. John have studied this problem as a combined study. Some of these cases have been presented at our weekly clinical pathologic conference by Dr. Von Glahn, others have been studied from material obtained at operation by Dr. Stout. Dr St. John has operated upon many of them. I shall ask Dr. Von Glahn to open the discussion.

Dr. Von Glahn: Very briefly I wish to present the histories of the cases, demonstrate the situation of the ulcers, and point out the vessels from which the hemorrhage occurred. The cases may be conveniently divided into three groups: gastric ulcers, duodenal ulcers, and marginal ulcer at site of gastro-enterostomy.

GASTRIC ULCERS

Case I (History 43,090, Autopsy 9537).—A man, fifty-nine years old, who nineteen years before death had a severe attack of indigestion, lasting for three weeks. Five years ago he suffered with epigastric pain which came on just before meals. This continued for one month. Three weeks before admission to the hospital he again had pain in the epigastrium, dull and pressing in character, coming on at irregular intervals and not definitely related to meals. The pain was relieved by lying down and by sodium bicarbonate. There was not any evidence of hemorrhage.

His physical examination showed definite tenderness on firm pressure over the left upper quadrant, more marked over the left half of the epigastrium. The x-ray findings were those of an ulcer in the stomach. The guaiac test on the stool was $++++$.

Three days after admission he vomited 850 c.c. of blood, and his blood-pressure fell to 50/40. The following day he was given a transfusion and was operated upon under local anesthesia. A large ulcer was found on the lesser curvature of the stomach. The gastric artery was ligated and the ulcer cauterized. A jejunostomy was done.

The ulcer is situated upon the lesser curvature of the stomach, 4.5 cm. from the orifice of the esophagus. It is 2 by 4.5 cm. in diameter and is saddle shaped. The edges are clean cut and
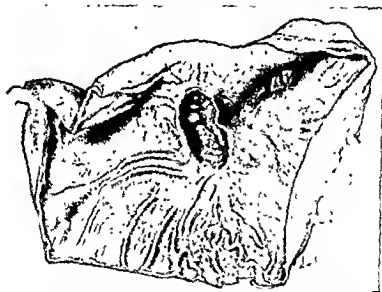
Fig. 240.—(Autopsy 9537.) Ulcer of stomach with erosion of gastric artery

undermined; about the ulcer are many adhesions, and in the base can be seen pancreatic tissue. The gastric artery has been eroded (Fig. 240). In the duodenum is a large diverticulum just beyond the pyloric sphincter and near its margin a small scar of a healed ulcer. It is quite likely that one of his previous attacks of indigestion was due to the duodenal ulcer.

Case II (History 36,045, Autopsy 9369).—The patient was a man, forty-nine years of age, who was admitted with the com-

plaint of pain in the abdomen. Eight years ago he had a single attack of epigastric pain so severe that he was confined to bed for two days. Five years ago he had "gastritis" for a short time, with spontaneous recovery. One month ago he had a sudden attack of weakness and epigastric discomfort following a meal of shellfish; he was confined to bed for several days Since then
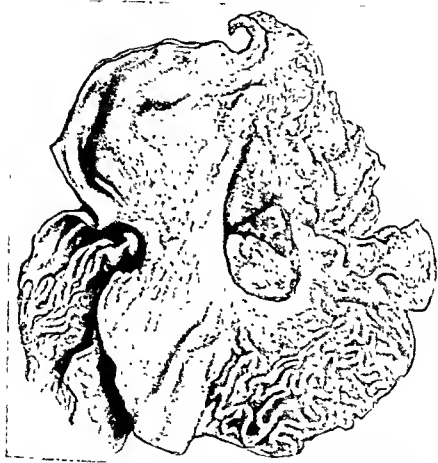
Fig. 241.—(Autopsy 9369.) Ulcer of stomach with erosion of gastric artery.

pain in the epigastrium had been constantly present, with cramp-like exacerbations coming on half an hour after meals. Nothing relieved the pain; food aggravated it. For two weeks he vomited "coffee-grounds" material four or five times daily, and on two occasions about half a cupful of red blood. He had been constipated and his stools were black after the onset of the pain.

There was no epigastric tenderness on palpation. The guaiac test on the stool was ++++. x-Rays showed the barium passing into a huge pocket through a large opening in the wall of the lesser curvature of the stomach.

He was given several transfusions and improved somewhat. An exploratory laparotomy confirmed the x-ray findings of a large ulcer on the lesser curvature of the stomach, and operative interference was considered impossible. For five days after operation his course was uneventful, then he had a large hemorrhage, following which he died.

The ulcer is situated on the lesser curvature of the stomach, 5.5 cm. from the esophagus and 4 cm. from the pylorus. It is saddle shaped and measures 5 by 8 cm. The edges are smooth, soft, and thin. The ulcer extends through the wall of the stomach, and opens into a cavity walled off by the under surface of the left lobe of the liver and the pancreas. The gastric artery and several of its large branches are widely open in the base of the ulcer and soft thrombi are in them (Fig. 241). The stomach contained "coffee-grounds" material and brown fluid

DUODENAL ULCERS

Case III (History 55,566, Autopsy 9320).—This patient was a man, thirty-four years of age, who had had dull "stomach pain" for five years. The pain came on every week or so, and continued for three or four days. It did not radiate; neither was there any nausea nor vomiting.

Six months ago he began to have severe cramp-like pain which did not radiate and which was relieved by food. The pain would awaken him at night, usually at 11 o'clock, and after taking a glass of milk he would be comfortable until the next day at 4 P. M. This continued for one month.

Three weeks ago the pain began again and radiated to the back and shoulder. He never vomited blood, neither had he noticed any change in his stools

There was definite resistance in the right upper quadrant of the abdomen. The x-ray showed an area with irregular outlines in the first part of the duodenum.

Five days after admission he complained of feeling dizzy and faint, and within a few minutes passed some dark red blood without any fecal material. The next day he had another hemorrhage and following this he was transfused. He was operated upon, a gastro-enterostomy was done, and a heavy silk ligature placed about the duodenum at the site of the ulcer. Five days after operation his condition suddenly became worse, and he passed a small tar-like stool. Within a short time he became unconscious and died.

At the autopsy an ulcer was found on the posterior wall of the duodenum. It began on the pylorus and had a smooth base.

Fig 242.—(Autopsy 9320.)   Ulcer of duodenum with aneurysm in base.

In the distal end of the ulcer was an irregular cone-shaped, friable mass to which clung some fresh blood-clot (Fig. 242). The stomach and duodenum were filled with clotted blood and throughout both the large and small intestine were many large clots.

When the pancreaticoduodenal artery was dissected out, it was found to lie directly beneath the ulcer and a branch passed upward at right angles to the base of the ulcer. This branch suddenly ballooned out into a wide channel, bulging into the floor of the ulcer. The bleeding followed rupture of this aneurysm.

Case IV (History 51,356, Autopsy 9366).—This man, aged fifty-four, was admitted to the hospital on three occasions. His complaint was epigastric pain, constipation, loss of appetite, weakness, and drowsiness. He dated the onset of his illness to a time three years before his first admission, when he had pain in the upper abdomen which lasted for about ten days. He felt well for a year; then he again had pain, lasting for two weeks.

Fig 243 —(Autopsy 9366) Ulcer of duodenum

During the past two years he had had five such attacks The pain was localized in the left upper quadrant; it radiated *to the lumbar region* and sometimes to the suprapubic region. The pain was colicky and sticking in character and was *immediately* aggravated by food; it was relieved by vomiting and by defecation. The vomitus always consisted of the food just eaten. Constipation was persistent He never had tar-like stools.

The first stay in the hospital was of three weeks' duration and the subjective signs were more marked than the objective findings. Gastric analysis showed a moderate hyperacidity. x-Ray examinations of the gastro-intestinal tract were negative.

The attacks of pain recurred shortly after his discharge from the hospital and he was treated in the out-patient department for a time, then readmitted to the ward. The physical examination did not disclose any new findings. There was a moderate hypo-acidity of the gastric content. Roentgenograms showed an apparent constriction of the duodenum a little beyond the pylorus.
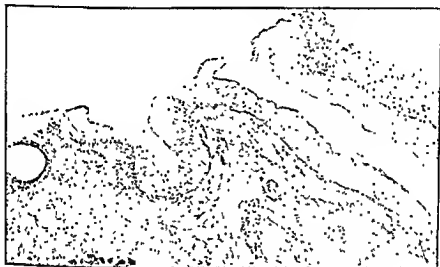
Fig. 244.—(Autopsy 9366.) Section through the base of the ulcer. Erosion of a branch of the pancreaticoduodenal artery.

Examination of the stools for blood was negative on four occasions. The pain ceased after three weeks and he was discharged at the end of eight weeks, feeling much improved.

Soon after his discharge all of the symptoms recurred, and he was again admitted to the hospital. There were no new findings on physical examination. An exploratory celiotomy was performed and a white puckered area was seen on the surface of the duodenum. There were many adhesions between the liver, pylorus, omentum, transverse colon, and hepatic flexure of the colon. A gastro-enterostomy was done.

Following the operation he had intermittent hiccuping and

soon bad signs of consolidation in each lower lobe. His temperature rose and he died two days later.

The ulcer was situated on the posterior wall of the duodenum, 1.5 cm. from the pylorus. It was 3 by 2 cm. in diameter. The margins were overhanging; the base smooth, with a little ridge in the midportion (Fig. 243). Through a small opening in this ridge a few drops of blood welled up when gentle pressure was made upon the head of the pancreas. The ridge was formed by the pancreaticoduodenal artery and from it a small branch came off and opened into the floor of the ulcer and, in fact, formed a small portion of the ulcer base (Fig. 244). There was no thrombus in this branch and it readily admitted a probe of medium size.

MARGINAL ULCER AT SITE OF GASTRO-ENTEROSTOMY

Case V (History 51,557, Autopsy 5921).—This is the most interesting case of the series. The patient was a man, fifty years old, who was first admitted to the hospital in 1921, with the complaint of "stomach trouble." He placed the date of the onset of his illness in 1912, when he had a hemorrhage from the stomach. Previous to this he had had slight indigestion after eating heavy foods. In 1915 he again vomited blood. After treatment, lasting for about three weeks, he was much improved and had no symptoms, other than occasional attacks of mild indigestion, until four months before entrance to the hospital when he said that he began to be bothered by food "turning sour" in his stomach and by regurgitation and occasional vomiting. x-Rays showed the stomach to be quite large; there was a large retention, and evidence of an obstruction at the pylorus. The outlines of the stomach were regular. In a later x-ray examination a deformity was made out in the first part of the duodenum. He was operated upon and an ulcer was found in the duodenum. A posterior gastro-enterostomy was done.

His recovery after the operation was uneventful. He had no recurrence of the previous symptoms.

Three years after the operation he was again admitted because that day he had suddenly become dizzy and had sweated pro-

fusely. He induced vomiting and brought up a large amount of bloody fluid. After entering the ward he continued to vomit blood, about 1500 c.c. in all, and was given a transfusion of 850 c.c. of blood the next day. Less than two hours after the transfusion he vomited about 1000 c.c. of bright red blood. Later he vomited fluid and some clotted blood. He died within a short time.
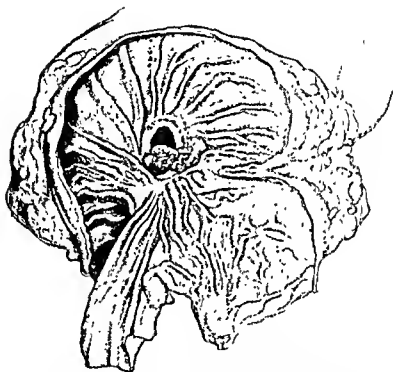
Fig. 245.—(Autopsy 5921.) Marginal ulcer on jejunal side of gastro-enterostomy opening. A mass of clotted blood clings to the base of the ulcer.

In the duodenum there was a healed ulcer 2 cm. from the pylorus, with considerable narrowing of the lumen at that point. The stomach was dilated and contained a small amount of dark blood. The gastro-enterostomy opening was widely patent. On the jejunal side of the stoma was an ulcer about 2 by 1 cm., with smooth edges and base, and clinging to the base was a blood-clot (Fig. 245).

The stomach had been injected with gelatin before being opened and the injection mass could be readily seen to have filled the vessels in the gastric mucosa about the gastro-enterostomy opening. None was visible in the jejunal mucosa and none of it appeared in the base of the ulcer. The bleeding had apparently all been from eroded vessels in the wall of the jejunum.

DR STOUT: The material which comes into my hands is derived from operations here in the hospital. I have been rather surprised in looking over the cases of bleeding ulcers how seldom we find evidence of the site from which the bleeding occurs. Possibly this is because we have in the past not searched diligently enough. I suppose in order to demonstrate the thing in each case one should make serial sections of the ulcers. With a large amount of material that is very difficult unless one is making a special research into the subject. I have found really large vessels only three times and a smaller vessel once. I have selected one of each type of case to show you to supplement what Dr. Von Glahn has been saying

The first case is a man who had had stomach trouble for years and who came into the hospital for study. He had no history of bleeding up to that time. He was ordered for a gastro-intestinal x-ray series, and one-half hour before he went down he vomited 150 c.c. of bright red blood and one-half hour later another 150 c c. He was treated by morphin and rest and as soon as his condition allowed he was operated upon and a large lesser curvature ulcer found.

We were able to demonstrate in its bed three veins of good size.

This is an ulcer which went all the way through the muscularis. All of the vessels contained thrombi. This was six days after the event of bleeding occurred. We made serial sections of the ulcer, one of which showed the second vessel projecting above the surface of the ulcer.

The other case which I have to show you did not have any active bleeding, but occult blood was found in the gastric analyses once out of several examinations It was a penetrating

ulcer which extended along the lesser curvature and into the posterior and anterior surfaces.

In this second picture is shown on the floor of the ulcer an unusually large capillary which seemed to have fluid blood in it and projects above the surface of the ulcer bed. It is possible this patient would have had some hemorrhage a little later from that vessel.

DR. F. B. ST. JOHN: There is a wide-spread impression among physicians and surgeons that hemorrhage from ulcer of the duodenum and stomach is rarely fatal. This belief is undoubtedly based on the experience of generations of the profession over a long period of time. Although, in general, it is borne out by facts, exceptions nevertheless occur with sufficient frequency to disturb the mind of the thoughtful physician who would be prepared for the exceptional as well as the expected outcome. It is not alone because of this, but rather because a fuller knowledge of the underlying pathology may not infrequently save life in these very cases, that this clinic feels it important to emphasize the fact that a certain number of patients suffering from ulcer of the stomach and duodenum do bleed to death. Dr. Von Glahn's demonstration of the pathologic material from this hospital, illustrating this tragic outcome of ulcer, leaves nothing to be said for purposes of emphasis.

Hemorrhage as a clinical observation presents itself in several forms to the practitioner, and may very well vary from the insidious leakage recognized only by careful stool examination and unknown to the patient, to the sudden arterial hemorrhage with fatal results within a few hours.

In the first type mentioned, in which the only evidence is the positive test for blood in the stool, it is our practice, if this persists, to advise absolute rest in bed for at least three weeks, with frequent feedings, usually in the form of a Sippy diet or a modification of it with alkalies. In these cases operative interference is resorted to only on the usual evidence considered indicative in cases of ulcer in general, viz., persistent symptoms or bleeding after carrying out carefully the conservative treatment.

Another type which presents itself for consideration is the

active hemorrhage in a relatively young individual who gives
no previous history suggesting ulcer. The treatment which I
have just briefly outlined is also carried on in these cases, pre-
ceded by a period in which nothing is given by mouth, fluid
substitution being accomplished by hypodermoclysis, rectal
taps, etc. Continued dietary régime with alkalies should be
followed for a varying period of time, not less than six months.
The elimination of constipation we feel to be of great impor-
tance in these as in all cases of ulcer. Again, as in the previous
group, operation is advised in the event of failure to control
symptoms and bleeding by medical treatment, except that in
this group the occurrence of one active hemorrhage must be
weighed in the balance of evidence in favor of surgery. In
the event that an arterial hemorrhage of any magnitude has
once taken place in a patient with a definite history denoting
chronicity, and with positive roentgenologic evidence of loss of
substance, surgery is advised, if there be no contraindicative
findings.

In other words, we believe that in the case of an ulcer on
the posterior wall of the first part of the duodenum or at the
pylorus or lesser curvature of the stomach, apparently chronic
and from which active arterial hemorrhage has taken place,
surgery with the removal of the cause of bleeding is safer than
so-called conservatism, and is therefore the procedure to be
advised. Gastro-enterostomy, although in many cases not fol-
lowed by further hemorrhage from the ulcer site, obviously
offers no assurance that a second severe hemorrhage will not take
place, as we have seen in some of the specimens demonstrated
to you. That it is associated with less operative risk is fully
recognized and duly considered. The feeling of the clinic in the
cases in which active hemorrhage continues, despite rigid rest
for the gastro-intestinal tract and its accompanying treatment,
is that the sooner the site of bleeding can be adequately con-
trolled by surgery, the better.

The question of when to operate is an important one. This
is especially true in the severe types and depends much on the
condition of the patient. Dr. Von Glahn presented 2 cases in

which hemorrhage continued and apparently increased following transfusion. In spite of these cases, however, one cannot but feel that transfusion is of the greatest assistance, and a curative operative procedure may frequently be carried on largely because of its use, the operation not being unduly postponed following the transfusion.

To summarize: It is our belief that bleeding is a serious complication of gastric or duodenal ulcer; that it may be controlled by so-called conservative treatment in its milder forms, but that in its continuation or in its severe form it is a grave complication in which radical removal or control of the site of bleeding offers the best chance of permanent relief to the patient Finally, as a result of our observation, the pyloric and lesser curvature gastric ulcers and the chronic ulcers on the posterior wall of the duodenum are the most dangerous from the standpoint of hemorrhage and should be treated accordingly

GROUP OF UNUSUALLY SEVERE GASTRIC ULCERS

The group of cases which will now be presented is a relatively small one. It consists only of severe lesions of the stomach requiring resection; though in a few instances where that procedure was considered impossible because of the extent of the pathology, some other method, such as cauterization, gastrogastrostomy, or exclusion was used.

This group of ulcers of the stomach was operated upon by members of the surgical staff of this hospital during the period from 1916 to 1924. The severity of the lesions and the follow-up results are the factors which will be especially emphasized, the indications for the various types of resection and other procedures being taken up by Dr. Whipple.

There are 43 cases in the group. Of these, the lesion was confined to the pyloric portion of the stomach in 21 cases, the anterior wall being involved in 10 and the posterior wall in 11 cases, all of the latter being more or less adherent to the pancreas.

In 8 of the cases involvement was confined to the pars media and 1 involved the cardiac portion. The remainder, 13 in number, involved the lesser curvature, extending over more than one portion of the stomach.

Of the entire group, the severity of the lesion can perhaps best be appreciated by the fact that 21 were adherent to the pancreas, liver, or posterior abdominal wall; 11 were perforated ulcers of the posterior wall, and 4 presented double ulcers, in addition to which several cases had previously been operated upon.

As to the results of operative procedure in those cases: all of the cases have been followed by personal visits and direct observation by the surgeon, with the exception of 5, which have been lost to the follow-up clinic. Eleven cases are dead, and of these, 7 must be considered as operative deaths, inasmuch as they died in the hospital from complications following the operative procedure, as follows: 2 of hemorrhage, 2 of peritonitis following leakage, 1 of subphrenic abscess following leakage, and 3 of postoperative pneumonia. This mortality of 16 27 per cent. even in these complicated cases is too high, and from the above analysis as to the cause of death it is apparent that measures must be taken to definitely lessen it

Of the 4 remaining cases not living, 1 died of tuberculosis three months after operation; 1 of Streptococcus hemolyticus bacteremia four years following the operation, before which the patient was entirely symptom free and was carrying on his usual occupation; 1 from perforated ulcer of the duodenum, who had been symptom free and working for seventeen months following the operation; and 1 from hemorrhage, this last case being an enormous perforated ulcer of the posterior wall of the pars media, 7 by 5 cm in extent, which was simply explored, but found entirely inoperable because of very extensive adhesions, the operation, of course, having no effect in stopping hemorrhage.

Of the remaining cases, 27 in number, the results are as follows:

Twenty are symptom free for an average period of 30 95 months, or two and a half years. These cases are of individuals who are carrying on their usual occupations and at least 50 per cent. are following a rather generous but plain diet which we strongly advocate following operative procedure in this type. The longest case followed is one of six and a half years following

operation. The others appearing on the follow-up records are for a minimal time of six months, with one exception, and as mentioned above, the average length of time since operation is two and a half years.

Of the remaining 7 cases, 6 are greatly improved and are carrying on their occupations, but because of periodic indigestion, which however may be absent for periods of as long as a year at a time, we do not feel justified in including them in the symptom-free group. One case has not been improved by operation, and is considered a symptomatic failure

SUMMARY OF RESULTS

Total number of advanced, complicated ulcers of the stomach, in which treatment has consisted chiefly in partial gastrectomy . . 43

Deaths to be recorded as traceable to operation 7

Deaths occurring from three months to four years after operation, from other causes than the gastric lesion.... 3

Number of cases lost to follow-up clinic.... 5

Number of cases carefully followed and in current follow-up clinic . . 27

Number of cases symptom-free and working 20

Number of cases greatly improved and working, but with periodic indigestion 6

Number of cases unimproved and therefore symptomatic failures . . . 1

A word or two about the postoperative care, especially as to advice upon leaving the hospital, follow-up visits, and observation. Before leaving the hospital the surgeon, at discharge rounds, presents the patient with written instructions as to diet, mode of living, care of the bowels, etc., and at the same time advises him when to begin work. It is at this time of all others that the seeds of an excellent follow-up system are sown, and in no type of case is it more important than in ulcer of the stomach and duodenum. We emphasize the importance of diet for long periods following operation—usually a minimum of twelve months—and these cases are never closed on our follow-up records, because of the falsity of records of cases followed but a short time, and the information one gains of carefully followed cases over a long period of time.

It is our custom to have each patient report to the surgeon who operated upon him one month after discharge, when the

patient may see the surgeon by appointment in an office, and when the surgeon has time to discuss matters carefully with him At this first visit the contact between patient and doctor, made in the hospital, is strengthened, and the very important habit of returning to his doctor's follow-up clinic is initiated.

Dr Whipple. Dr. St. John has referred to the study of these patients in several groups Just a word about this in introducing Dr Golden We feel strongly here the importance of co-operation between the medical, the x-ray, and the surgical groups of the hospital. We have been able to put our theories into practice and there is not a single case of ulcer that has been operated on in the last one and a half or two years that has not been studied by the three groups. Since Dr Golden has taken charge of the x-ray work here, I can say we have profited tremendously in the experience that we as surgeons have gained from the actual study of these cases from the x-ray standpoint In my own case I used to think I knew something about the interpretation of films and plates, but I was never clear in my own mind about fluoroscopy I now feel much more certain of fluoroscopic interpretation than I do of x-ray, and this is due to the fact that Dr. Golden takes time to explain his interpretation of these cases. Dr Golden has been particularly interested in the study of these ulcers, and in going over the cases I was very much interested to find that some 94 per cent of the cases of ulcers proved by operation, or those cases of which Dr. Von Glahn has spoken, were diagnosed by the x-ray by Dr. Golden before operation. He is going to say a word about an interesting group of cases of penetrating ulcer of the lesser curvature

This particular group of ulcers has interested us very much. We feel that this is a subject, however, that must be studied by both groups and the cases followed over a long period before we can say that these ulcers are entirely healed. It is of interest that the 2 cases studied at autopsy still showed some evidence of the defect in the mucous membrane, and I think this explains some of the ulcer cases that are apparently cured several times by medical measures.

DR. GOLDEN: The real conditions upon which light may be thrown by Roentgen-ray examination of the stomach and duodenum may be divided into three general classes: (1) Organic lesions of the stomach and duodenum, such as ulcer, carcinoma, polyps, etc.; (2) anatomic variations, such as diaphragmatic hernia, diverticula, so-called "duodenal bands," etc , (3) pathologic conditions outside the stomach, such as cholecystitis, cirrhosis of the liver, carcinoma of the pancreas, etc , which may affect the physiology of the stomach, reflexly producing an abnormal peristalsis, pylorospasm, spasm of the gastric musculature, and which may manifest themselves by distorting the gastric or duodenal outline through actual pressure or by adhesions.

The barium meal is useful in showing changes in the size of the crater of an ulcer on the lesser curvature of the stomach indicating the effect of treatment. We have had the opportunity recently to examine pathologically 2 cases in which the shadow of the ulcer disappeared or was greatly diminished in size.

The first patient was a man about fifty-five years of age who appeared at the Lenox Hill Hospital in March, 1922, complaining of gastric symptoms. Roentgen-ray examination of the stomach disclosed a rather large penetrating ulcer of the lesser curvature, the shadow of which measured about $1\frac{1}{2}$ cm. in breadth. There was a large six-hour gastric retention No barium passed into the duodenum during the examination, arousing a suspicion of a duodenal ulcer After a number of weeks of medical treatment he was discharged and remained symptom-free until December, 1922. He came to the Presbyterian Hospital in March, 1923, complaining of a three-month recurrence of epigastric pain and of difficulty in walking. Roentgen-ray examination of the stomach showed no evidence of a crater on the lesser curvature and peristaltic waves seemed to pass without difficulty over the region where the ulcer had been demonstrated. There was a large six-hour gastric retention. At our first examination we were unable to force any barium into the duodenum. At a second examination, after the patient

had been atropinized, we were able to see the duodenal bulb as a narrow irregular linear shadow with a dot representing the crater of an ulcer. Although the patient complained of no pulmonary symptoms, roentgenograms of the chest and bronchoscopy disclosed ac arcinoma of the bronchus to the right upper lobe, of which the patient died.

At necropsy a small gray spot was found on the lesser curvature of the stomach about 3 mm. in diameter which, upon histologic examination, was found to be the ulcer. It was very shallow, involving only the most superficial muscle-fibers just underneath the mucosa There were two duodenal ulcers. Although we had found a 90 per cent six-hour gastric retention, the pylorus was lax and wide open and showed no evidence of organic constriction. The gastric retention must have been due largely to reflex pylorospasm from the duodenal ulcers. There was also a primary carcinoma of the right epiarterial bronchus with a large necrotic metastasis in the cerebellum which accounted for the difficulty in walking.

The second patient was a woman about fifty-nine years of age with an involutional psychosis. She had been having gastric symptoms for a number of months and was thought to be neurasthenic. The Roentgen-ray examination disclosed a large penetrating ulcer of the lesser curvature of the stomach. She was treated medically and was re-examined one month and two months later The shadow of the crater diminished to less than a quarter of its original breadth and depth. Four months after leaving the hospital she died suddenly At necropsy a shallow gastric ulcer measuring 5 by 8 mm. was found. Special stains of the histologic sections showed an abundance of fibrous tissue about the base of the ulcer.

A third case which has interested us tremendously was that of a man, age seventy-five, who came to the hospital complaining of severe gastric symptoms of a number of months' duration. He was so anemic and cachectic that carcinoma of the stomach was suspected He had to be transfused before he could come to the Roentgen-ray Department for examination. He had an enormous ulcer rather high on the lesser curvature, the shadow of

which measured 4 cm. at its base. Under medical management his symptoms disappeared and his condition improved rapidly. Re-examination a month later disclosed a remarkable diminution in the size of the crater shadow. After leaving the hospital he continued his dietary régime and continued to improve. A Roentgen-ray examination of the stomach a year later failed to disclose any evidence of a crater. There was, however, a medium sized six-hour gastric retention. Two years after his admission to the hospital the patient reports that he is in excellent health, in great spirits, and is actively at work. In view of our experience with the first case we can hardly consider it proved that the ulcer has completely healed. There may be a very small erosion remaining, the crater of which is filled with fibrin or some other material which keeps it from filling with barium and hence from showing at the Roentgen-ray examination.

Finally, in regard to the co-ordination of effort which has been mentioned in connection with the study of these gastric cases, I wish to express my appreciation of the interest taken by the surgical staff in the gastro-intestinal examinations, and of their efforts to help us check up the work. It is the custom here for the operating surgeon to request a nurse to call the Roentgen-ray Department when the abdomen is open so that we may see the pathology without undue loss of time. It is perhaps needless to point out the value of this in increasing the accuracy of gastro-intestinal diagnosis. It is a custom which is—from my standpoint—most worthy of emulation.

DR. WHIPPLE: Indications for Various Types of Operations.— In regard to the various operative procedures for ulcer we are not as enthusiastic over the Billroth I operation as are many surgeons in some of the foreign clinics here and abroad. We believe that for a simple ulcer on the anterior wall of the first portion of the duodenum a posterior short loop gastro-enterostomy gives such good results that the extra hazard of an extensive resection is not warranted. We have followed our gastro-enterostomies carefully by x-ray studies in the past four years and have had but one case of marginal or jejunal ulcer develop after operation. This point of view is corroborated by the very convincing

ten-year follow-up studies reported by Balfour in the Jour.
Amer. Med. Assoc. for August, 1924

Where there is hemorrhage from the pancreaticoduodenal
branches in an ulcer on the lateral and posterior wall of the first
portion of the duodenum, we are inclined to use a Billroth II,
inasmuch as too much of the stomach does not have to be re-
sected   Where the ulcer is situated in the prepyloric area or on
the lesser curvature, requiring a more extensive resection, we
use the Polya or the Polya-Balfour, and in the latter we are in-
clined to add an entero-enterostomy to avoid the duodenal dila-
tation that sometimes follows an angulation at the stoma.   We
have used the Moynihan in 3 of these cases, and with good
results, but there are certain disadvantages to it.   The blood-
supply to the blind vertical segment of jejunum is easily com-
promised, there is a great deal of stitching, and there are no
inversions

We have had seven midgastric resections for ulcer of the
middle third, and favor this procedure when there is a freely
movable gastric wall, with the ulcer at the middle third, and if
there is an hour-glass deformity   If the stomach is not adherent
the procedure is easy and takes less time than a Polya or a Bill-
roth II.   We have had excellent results and no hour-glass de-
formity, due, we feel, to using care to avoid any puckering in the
through-and-through sutures

We have used gastro-gastrostomy for those cases of hour-
glass contracture where the posterior wall was densely adherent
to the pancreas, the anterior wall of each pouch being the only
available site for anastomosis

We have had no experience with the double anterior gastro-
jejunostomy advocated by Gibson

TABLE

Billroth II	17
Polya-Balfour	9
Moynihan	3
Midgastric resection	7
Gastrogastrostomy	3

You may be interested in our follow-up, especially in its relation to gastric cases. We are convinced that correct and carefully explained advice to the patient before he leaves the hospital determines very appreciably the follow-up results. We urge the patients to eat five small meals rather than three regular meals; we give them typewritten instructions as to the articles of food and in some cases we continue alkaline powders for a few weeks if their free hydrochloric acid is still high   Advice as to exercise, resumption of work, re-establishment of regular bowel habits, and discontinuance of all forms of catharsis are explained to the patient.

We try to see every patient for varying periods of time after operation. Last year we interviewed and examined 82 per cent. of our patients on return visits. In addition we had letters from patients, their physician, or a follow-up nurse's note in 10 per cent. more, making a total of 92 per cent. followed.

We find three factors essential to the success of a follow-up clinic in a large city: First, a careful explanation to the patient when he is ready to leave the hospital of our reasons for wanting him to report back. Second, the giving of an early date, within three to five weeks after leaving the hospital, for the first return visit. Unless this is done, with such a transient population, many patients are permanently lost to all postal and hospital tracing. Third, frequent visits every four to six months. This applies especially to all cases of malignant disease, but also to such lesions as ulcer, tuberculosis, or chronic disease, where recurrence is unfortunately common. Once the patient is convinced that the surgeon is sincerely interested in his case, he will make remarkable sacrifice to keep his follow-up appointments. In the last analysis the success of a follow-up clinic depends upon the establishing of the personal contact between patient and physician and keeping in touch with the patient's private physician, to whom all cases should be referred on leaving the hospital.

With regard to filing our follow-up results or, as we call them, interval results, I would say a word. We do not use the term "end-result," especially in umor cases. We file under various

intervals, such as four, ten, eighteen, forty-eight months; the result under three headings: the anatomic, the symptomatic, and the economic result, in an ascending scale from 0, which denotes a complete failure, to 4, which is the optimum. Thus a hernia may have a six months' interval result of 4 4 4, meaning an optimum result from all standpoints, but an eighteen months' result of 0 0 2, where there is a recurrence of which he complains emphatically, and which reduces his earning capacity by one-half. These interval results are filed under the diagnosis of the various lesions in our disease Classification File, so that everyone can turn immediately to the results in looking up any diagnosis. This system we believe to be the most honest and practical. It was worked out and installed in this hospital some eight years ago, so that our result file is now of real value to the staff and to the students in their fourth year.

Dr. FREDERIC T. VAN BEUREN exhibited 3 patients who had recovered from acute ileus due to peritonitis or mechanical obstruction, after treatment by operation, including a jejunostomy.

Case I illustrated the use of a primary jejunostomy as a last resort in a late case of peritonitis.

B. S., age ten, white male, No. 57,704.

Six days' history of abdominal pain and vomiting. Physical examination, exquisite tenderness over entire abdomen. Both recti of board-like rigidity. Tender mass per rectum in midline. W. B. C. 23,400, polys. 89 per cent., temperature 101 8° F., pulse 126, respiration 32. Facies the picture of advanced peritonitis—hippocratic in type.

Stat operation—right rectus incision, pus evacuated. Appendix not found in about ten-minute search. Rubber tube with wick to pelvis, cigarette drain to each lumbar gutter brought out of single abdominal incision. Witzel technic jejunostomy with No. 18 F. catheter brought out of stab wound in left upper quadrant. Culture of pus at operation Bacillus coli, non-hemolytic streptococcus.

First day postoperative temperature 101° to 103° F., pulse 140, respiration 32. Weak, sweating, abdomen moderately distended, but soft. Vomited. Gastric lavage relieved upper abdominal distention.

Second day postoperative temperature 101° F., pulse 120, respiration 28. Soft distention. Nothing p. o. 2200 c.c. fluid p. r. and hypodermoclysis.

Third day postoperative. Enterostomy tube slipped out—has drained 225 c.c. foul fecal smelling fluid to date. Tube replaced.

Fourth day postoperative. Temperature 100° F., pulse 90, respiration 24. Much brighter. Scaphoid abdomen. Liquid stool with s.s. enema. Went on to an uninterrupted convalescence without sequelæ.

Thirty-second day—Discharged. Wounds healed. Enterostomy seemed to prevent severe distention and helped tide patient over critical forty-eight to ninety-six hours postoperative.

Twelve months follow-up. Weight 85 pounds. Weight upon leaving hospital 63 pounds. Well in every way.

Case II illustrated the use of secondary jejunostomy for mechanical ileus occurring after operation for appendicitis:

R. Z., age thirty, white male, No. 58,340.

Seven-day abdominal history with mass in r. l. q. Stat op. Appendectomy with drainage, 2 rubber tubes in abscess. Op. recovery good Irrigated with O. D. dressing. Dakin started on third day. Began hiccoughing third day, vomited 250 c.c. Fourth day—lavage gave little relief. W. B. C. 7500, polys. 71 per cent. Fifth day—nothing p. o. failed to check hiccough. Considerable flatus with C. I. Moderate distention persisting. Sixth day—hiccough continues. General condition good. Tubes replaced by catheters. Lavage did not entirely relieve hiccough.

Seventh day—Hiccough steadily, occasional vomiting. Lavage—return brownish-gray fluid. Rx. partially effectual. Eighth day—hiccough less, vomited twice. Lavage return fecaloid. Blood urea 0.72 gm. per liter CO_2 59 volumes per cent.

Enterostomy—ninth day postoperative for persistent hic-

cough, vomiting, and moderate distention Small intestine adherent to right lateral pelvic wall where gut was knuckled. Intestine above very distended, visceral peritoneum granular. Op. Witzel jejunostomy—tube out wound

First day postop. Ent drainage 1800 c c Immensely improved. Vomiting ceased. S. S enema gave good result Abdomen soft.

Second day—Blood urea .35 gm. per liter. 002 67.1 volumes per cent. Steadily improving. Drainage 800 c.c.

Third day post ent. Ent drainage 525 c.c. Convalescence continuous and uneventful Ent tube out tenth day. No discharge after fifteenth day Discharged thirtieth day postop.

Seven months follow up Well in every way without symptoms.

Case III illustrated the use of primary jejunostomy as a prophylactic against the development of paralytic ileus in an early case of peritonitis from ruptured intestine.

L H , white male. age twenty-nine, No. 60,611.

Struck by wood thrown from saw, in r. l. q at 10 15 A M Came to P H. twelve hours later Rigid abdomen, W. B C. 17,600—polys. 90 per cent. Urine negative Stat op. performed. Perforated ileum, antimesenteric border about 1 foot above ileocecal valve Small gut content throughout r and l l q , pelvis and r. l gutter. *Perforation closed Peritoneum cleansed as well as possible—jejunostomy*, Witzel technic through stab wound l. i. q. Abdomen closed without drainage

First day postop. No drainage from enterostomy tube. Same irrigated. B P 112/86, temperature 105° F , pulse 140, respiration 30, pinched facies. sweating, looks very ill.

Third day—ent drainage 450 c.c., temperature 101° F., pulse 88, respiration 80. *No vomiting.* Good return from enema. Very slight distention. Occasional hiccough

Fourth—much more comfortable. Ent drain 350 c c

Fifth—improving steadily. Drainage 250 c.c., temperature 101° F , pulse 100, respiration 22.

Sixth—from here on made uneventful recovery except for

infected op. wound which healed by granulation. Wound was drained at op. down to peritoneum.

Thirtieth day—Discharged.

Follow up two months. Occasional attack of abdominal pain, not severe; tenderness without hernia in abdominal wound.

Dr. van Beuren then pointed out that the mortality of cases of acute ileus in which jejunostomy had been performed was still extremely high; but that while the mortality from acute ileus in general, except in small groups of cases, was just as high as it had been twenty-five years ago, the mortality of the group of such cases that were treated by jejunostomy was definitely lower than it had been twenty-five years ago It appeared therefore, he said, that the proper use of jejunostomy was a real advance in the treatment of acute ileus from a practical as well as a theoretic standpoint. He showed, by comparisons of the last four-year series of acute ileus cases with the previous four-year series, that the mortality of the jejunostomy group had been improved more than the mortality of the series as a whole, and more than that of the group of cases who had not been treated by jejunostomy. These indications, he continued, led him to feel that primary jejunostomy used more often as a prophylactic measure and less often as a last resort in a secondary manner, would probably improve the mortality of the entire series (in the coming four-year period) as well as the jejunostomy group.

Dr. van Beuren stated that he did not believe there would be any extraordinary lowering of the mortality from acute ileus until early diagnosis and treatment became the rule rather than the exception, or until an antidote is discovered for the ileus toxin.

TUBERCULOSIS OF THE CERVICAL LYMPH-GLANDS

Dr. J. M. Hanford

During the past seven years some 300 patients with tuberculosis of the cervical lymph-glands have come under observation and treatment. This morning 6 patients are presented to illustrate some of our thoughts upon treatment. These are all

follow-up cases who have become apparently cured or so markedly improved that the disease is apparently arrested. In New York City our essential principles in treatment and our main agents have been, thus far, the following:

1 Eliminate foci of infection.

2 Selected operations, but not operation on every case.

3. Repeated relatively small doses of filtered x-ray to the lesions.

4 Cod-liver oil.

5 Rest, fresh air, sunlight, and the ultraviolet light, as these are needed or available.

It is strongly felt that carefully selected operations and prolonged series of x-ray treatments are a decided help when combined with the various forms of general or constitutional treatment

J S came to the Presbyterian Hospital in May, 1924, age fifteen years, with history of swollen glands of the neck of four months' duration. First swelling was under his chin His tonsils had been removed. Examination revealed a cystic swelling in the suprahyoid region, a 1½ cm. firm node in the right submaxillary region and 2 by 2½ cm. nodes in the left subangular regions. No active foci of infection were found except the simple laryngitis, secondary of a chronic sinusitis of the frontal and maxillary sinuses. His blood Wassermann was negative x-Ray and physical examination of the chest show no evidences of active tuberculosis, though there were calcified nodes in both hilus regions. He was operated upon June 4th, on the right side of the neck, for the removal of the submaxillary and submental lesions. It was decided at that time not to operate upon the left side. The tissue examination showed tuberculosis. The wound was healed a week after operation and has remained healed. He was then started upon x-ray therapy to both sides of the neck. He has had nine treatments to date at intervals of two weeks and his present condition is as follows: There is a transverse keloidal type of scar. There are three discrete subcutaneous cystic lesions under his chin, a cystic lesion in the

left subangular region. He has been urged to have the maxillary sinus infections treated; to continue *x*-ray treatment and take cod-liver oil and to keep under supervision. The question is, Should he have further operative treatment?

J. F. This is a recent case, having come first in September, 1924, with a localized prominent swelling of seven months' duration in the left side of his neck. It had been firm, but when seen here had begun to soften. He had it treated by various conservative methods, including *x*-ray treatments. The swelling had increased. Otherwise he was generally healthy. Operation was advised, but the parents were still unwilling to have the operation done, but by October 3d they finally decided in favor of operation. A partial excision and curettage was done on October 6th. The tissue reported showed tuberculosis. Wassermann was negative; leukocytes were slightly elevated. Culture of the pus from the abscess was sterile. He has made a satisfactory recovery from operation, but the scar is not as nice a one as might have existed had he been operated upon before the stage of softening.

He is to have a good long period of *x*-ray treatments and careful dressings until the wound is healed.

Tonsils have not been removed, but look innocent.

H. W. He came for treatment at the age of forty-six in October, 1922. He had had the swellings in his neck for seven months. The blood Wassermann was weakly positive. There was no evidence of pulmonary tuberculosis. The condition of the neck at the beginning of treatment showed 3 by 4 cm. cold abscess in the middle of the right neck and beneath it a mass of firm glands Immediate incision and curettage of the cold abscess was done under ethyl chlorid inhalation. Microscopic examination of the tissue curetted showed no tuberculosis, but subsequent tissue examination showed definite tuberculosis of this same region. The culture of the pus was sterile on ordinary media. He was immediately started on *x*-ray treatment and had fourteen treatments between November, 1922 and May, 1923,

that is, in about six months His teeth were attended to His
tonsils were thought to be innocent by the laryngologist Sub-
sequent Wassermann was negative. By April, 1923, that is, five
months after the beginning of treatment, the sinus at the site
of the incision had healed and the neck contour was almost
normal, but he returned in December, 1923, about fourteen
months after the beginning of treatment and six months after he
was thought to have been healed, with a persistent sinus at the
same old site In January, 1924 a radical excision of this sinus
was done under ether anesthesia and the wound was closed by
sutures without drainage During this operation the spinal ac-
cessory nerve was accidently clamped, but not cut. When seen
in follow-up at one and seven months after this operation his neck
was perfectly healed. The contour was normal and no nodes
were felt. The scar was smooth and pale.

J R came for treatment at the age of seven. He was
a well-built boy and in good general condition. During treat-
ment he developed a tuberculous iritis. Condition of his neck
just before x-ray treatment showed several sinuses, enlarged
glands in nearly every neck region of large sizes The disease
was proved to have been tuberculous by microscopic examination
of tissue curetted from the wall of a small abscess He had
had the disease three years before treatment. Other treat-
ment consisted in numerous incisions at another hospital; one
incision at this hospital, which was done nine months after
thirty x-ray treatments for a cold abscess in the median line of
the neck Altogether he had fifty-six x-ray treatments during a
period of three years He was thought to have been cured at the
end of thirty treatments, but nine months later he returned with
recurrence in the median line. He was then given the remaining
treatments When seen one year after the last x-ray treatment
the neck was entirely healed. There were seven $\frac{3}{4}$ cm. nodes felt.
The scars were pale and fairly smooth. The boy appeared
healthy. Complete blood-count was normal.

S. B. was first seen at the age of twenty. Had a 4+ Was-
sermann. Diagnosis made was chronic pulmonary tuberculosis,

and had enlarged axillary glands. Condition of her neck just before treatment showed small crusted sinuses on both sides and large firm glands and numerous cold abscesses. The evidences of the neck lesions being tuberculous were persistent multiple sinuses which were considered tuberculous by numerous good clinicians Diagnosis of pulmonary tuberculosis and positive tuberculosis complement-fixation test. There is no positive proof that this case was tuberculous. The duration of the disease in the neck before the onset of x-ray treatment was five years. Other treatment—several incisions; ultraviolet light; mercury treatment for lues. She had forty-nine x-ray treatments over a period of four years. Marked improvement was noted only after one and a half years from the beginning of treatment. She was thought to be healed for a time, but five months after last treatment new lesions appeared. She was seen one year after her last treatment and at that time the neck had continued perfectly healed as well as the axilla. No nodes were felt. Blood-count was normal.

This case represents one having recurrence in spite of large amount of x-ray treatment, but finally became apparently cured. She has had no apparent ill effect from the x-ray treatment. The antiluetic treatment was refused. Operation of any radical sort was thought to be contraindicated.

She is now apparently cured.

L. J. She came for treatment at the age of twenty-nine. She has always been below par, rather nervous; not strong. Her first tuberculous gland was in the axilla. Condition of the neck just before x-ray treatment showed scattered 1½ cm. visible small firm nodes. The evidence of tuberculosis in this case was microscopic examination in the Presbyterian Hospital six years previously of glands removed. She had had the disease for sixteen years intermittently and the recent swelling for three months prior to the start of x-ray treatment. Other treatments which might have affected the result were nine previous operations followed by three months rest in the country between her two series of x-ray treatments and tonics. Her x-ray treatment was

given in two series of six and three treatments each one year apart; six treatments during five months and three treatments during one month. Four months after the first treatment her neck was better and she felt better than any time for sixteen years. One year after the end of the first series of treatments she returned with one of the previous swellings again enlarged and cystic. x-Ray treatments were resumed and she had only three. From that time on her neck has been in a satisfactory condition with only a few ½-cm nodes. These occasionally swell if she has a cold, so that now her neck has been in satisfactory condition for about five years following the last x-ray treatment.

This case represents a resolution of the cystic gland under x-ray treatment. Patient is greatly pleased to have escaped the tenth operation.

THYROID CASES

DR. WILLIAM BARCLAY PARSONS, JR.

I am going to discuss briefly the unsatisfactory results in operated cases of thyroid disease. We do not see so very many cases in New York during a year and have been doing this work for only four years, so have not had a large enough series nor long enough experience to discuss statistics and percentages.

These unsatisfactory results have occurred in spite of careful treatment. The cases are first worked up in our diagnostic clinic where in addition to history and physical examination, urine, Wassermann, blood-count, x-ray of chest, basal metabolism and laryngoscopic examinations are done as routine, and in many cases electrocardiographic study is made. The teeth are attended to and the tonsils when indicated. Some of the patients are admitted to the medical wards for preliminary treatment, but all toxic cases get preliminary rest with fluids up to 4 liters, provided they have no edema, sedatives, digitalis, a high caloric diet, and Lugol's solution for the exophthalmic groups. Many of the cases have had treatment elsewhere, some having proved refractive to radiotherapy. We attempt to judge of operability principally by improvement in symptoms, particularly the tachycardia and the weight, but we repeat the de-

termination of the metabolic rate one or more times, and if this shows a substantial improvement we derive much comfort thereby, but do not consider it alone as the yardstick for measuring improvement.

Before using Lugol's solution we did more ligations. Since using it I have noted definite improvement both in symptoms and in the size of the gland of greater degree than occurred without it. Many of the specimens removed in these later cases show scattered islands of colloid goiter, and more colloid in the hyperplastic acini, as though there had been an attempt at production of the resting stage of the gland.

In the operation we use nitrous oxid analgesia and local—except in the intrathoracic group, where novocain alone is employed. Recently we have experimented with ethylene and find it very satisfactory. Our anesthetist is skilful and administers a very satisfactory analgesia. A bilateral subtotal removal is usually done with division of the preglandular muscles. For the past year I have drained on one or both sides, carefully reconstructing the deep muscles in the midline, and feel that adhesion of the scar to the pretracheal fascia is thus done away with.

Ice-bags are used to neck and precordium before and after operation, and I have found the method of refrigeration outlined by Dr. Crile some years ago of great assistance.

The facts concerning the cases to be discussed have been obtained from personal follow up, none being included that has not been seen by me. The cases return to the follow-up clinic three times in the first year, and at six months' intervals after that, the basal metabolism being taken as nearly as possible twice a year. In analyzing the cases we have adopted the scheme of evaluating symptoms used by Kessel and Hyman in their paper in the Archives of Surgery. The symptoms complained of by the patient on admission are scaled as from 0 to 4. In the follow-up visits the score is again recorded for each of the symptoms. For example, a patient on admission might have severe tachycardia, moderate exophthalmos, slight insomnia, and no sweating. His score would then read: tachycardia 4, exoph-

thalmus 2, insomnia 1, sweating 0. We have as little confidence in letter follow ups in the **group of thyroid** cases as in other groups of surgical conditions, frequently getting an enthusiastic letter from a patient *who may return shortly after exhibiting one or more unsatisfactory features, and occasionally the reverse has been the case.*

In cases of simple goiter and non-toxic adenomata there have been *no deaths,* but there are 7 unsatisfactory cases. One had a swelling appear on the unoperated side eighteen months after operation, owing to incomplete exploration at operation. One patient apparently in excellent shape at twenty-five months committed suicide three months later. One has a poor scar, 1 a recurrent laryngeal paralysis to be shown in a few moments (Case I), and 3 have symptoms due to an inefficient heart damaged prior to operation.

In cases of toxic adenoma there have been 4 deaths. In 2 of these there was severe C. C. V. D., with auricular fibrillation that had apparently been compensated by rest and digitalis, but acute heart failure promptly followed operation. One fatal case occurred in a large substernal adenoma with tracheal pressure who was admitted almost in extremis with pneumonia; operation under local anesthesia with tracheotomy was done, but she died of her pneumonia. The fourth case was in an elderly man with rather mild hyperthyroidism, but with a poor heart. I made an error in judgment in his case in operating during the summer just after a hot spell, and ascribe his death to shock in which heat exhaustion played a large part. In this same group of toxic adenomata there are 6 imperfect cases. Two of them present persistent heart symptoms, 2 have slight recurrence of swelling in spite of bilateral operation, and 2 are emotionally unstable, one of them an excitable Irish woman, the other a rather despondent Jewish girl. The first 2 cases in this group have the more definite symptoms, but these are directly due to persistent cardiac damage that had been present prior to operation.

Of these 13 cases, 3 have slight swellings and 5 have persisting heart symptoms; the other 5 are almost satisfactory, but

not quite so and are therefore mentioned   Of the deaths, leaving out the pneumonia, 2, if not all 3, may be ascribed to the heart.

In our exophthalmic cases there have been 4 deaths in the hospital, and 1 ten months after discharge. In this latter case I attempted operation twice, but had to desist before succeeding in removing more than a small part of one lobe. She went elsewhere ten months later and died at operation. Of the other deaths, one followed shortly after operation and was a typical thyrotoxic shock. She was one of the first cases to whom I gave Lugol's solution, and I made an error in judging her operability, doing a thyroidectomy instead of waiting a considerably longer period and then perhaps doing a ligation. Another death that might have been avoided occurred in an extremely toxic man treated elsewhere for two years who had had successful ligations and thyroidectomy, but was improving very slowly. One week following thyroidectomy we decided to give him a transfusion. He had an immediate severe reaction and died in three hours. The other 2 deaths were in cases showing mania. In one a ligation was followed by temporary improvement, but the mania and vomiting recurred and patient died in a week's time. The other had been immediately improved by ligation, had become clear mentally, and was taking nourishment. Attacks of transient tachycardia with irregularity appeared and patient died suddenly of heart failure

There are 7 imperfect cases among the remainder of the exophthalmic group. In one of these there was an early recurrence and patient returned for a secondary operation at the end of two years. That was one year ago and she has since been well with a normal metabolism. Another has persistent exophthalmos as his only symptom, but this is severe enough to be a discomfort to him. A married woman referred by an obstetrician became pregnant about six months after operation, in spite of advice to the contrary, given, I believe, by him and myself. With this pregnancy there was a prompt recrudescence of symptoms. She had a curettage and she is now getting radiotherapy, with some improvement. The 3 remaining cases have persisting cardiac symptoms, 1 of them also having enough

exophthalmos remaining to interfere with her appearance, but not with her comfort   The seventh, a syphilitic, who had a long history before operation, returned home, where a drunken husband beat her frequently, and she is still nervous.

The lessons to be drawn from these unsatisfactory results are along three main lines, as certain features seem to be unavoidable, as, for example, the exophthalmos about which we know so little. First, recurrences should be avoided by thoroughness in exploring both sides for small adenomata, and care in removing enough gland. Second, the greatest care should be exhibited in waiting until the patients are definitely improving, and this is possible nowadays in a large proportion of cases by using Lugol's solution in addition to other measures   Last, the analysis shows that over half of the cases with unsatisfactory results in any particular degree can blame these symptoms on cardiac damage received prior to operation. This, I feel, is perhaps the most important point in urging early operation, not only in the toxic but also in the non-toxic cases, as further damage can thus be prevented

Case I.—E. D. Large substernal adenoma Operation under local. Paralysis of right vocal cord, sixteen days postoperative Voice returned again in three months, postoperative.

Case II.—M. H. Marked exophthalmic, good operative result Healthy baby at two years, at thirty months excellent result, anatomic, functional, and economical Normal metabolism.

Case III.—E. B. Girl five years old. Large thymus. Exophthalmos Tachycardia, nervousness, tremor, small goiter. Basal metabolism, +58 per cent. Under radiotherapy, rest, and Lugol's solution thymus shadow became normal and metabolism dropped to +19 per cent Symptoms slowly improving. Three weeks under treatment.

Case IV.—J. A., age twenty-eight, No. 61,124.

Chief Complaint.—Palpitation and pain in back for nine months.

Family history unimportant. No history of goiter.

Past History.—Patient is single, native of Spain, laundry worker by occupation. Habits excellent; no serious illnesses, operations, or accidents. Review of systems negative except for nocturia (2) for years.

Present Illness.—Acute onset following an accident in which his body was compressed anteroposteriorly in a machine. Since then has had intermittent "sticking" pain in lumbar region and sometimes in epigastrium. Precordial distress began about two weeks after accident and has become worse, accompanied by palpitation. Nervousness, occasional nausea without vomiting, hot and cold sensations over entire body, and progressive loss of strength and weight (145 pounds ten months ago to 121 pounds on admission). Headache and noticeable prominence of eyes for past two months. No diarrhea.

Physical Examination.—A fairly well-developed, thin young man, extremely nervous and excitable, with staring eyes and warm, moist skin. Wide palpebral fissure, *protrusion of eyeballs* and lid-lag, failure of convergence, and absence of wrinkling of forehead. Pupils equal, regular, and active. Deviation of nasal septum to right, tremor of tongue. Bad teeth. Hypertrophied cryptic tonsils. *Thyroid symmetrically enlarged*, soft, no thrill or bruit. Slight retromanubrial dulness. Lungs clear. Heart not enlarged, soft systolic murmur at apex. *Pulse rapid*, 130 to 140, regular, forceful. Blood-pressure 155/85. Abdomen negative. Spine negative. Rapid tremor of hands and fingers. Active reflexes.

Laboratory Findings.—Basal metabolism plus 104. Wassermann negative. Urine: Specific gravity 1025, reaction neutral, albumin trace, glucose positive, acetone negative. x-Ray of spine negative.

Preoperative Treatment.—Patient was kept in bed on a high caloric (2500 to 3000 calories) diet. Lugol's solution 0.3 c.c. t. i. d. and luminal 0.03 gm. t. d. were given. Digitan 0.2 gm. t. i. d. was started, but reduced to half the dose and stopped on

the fourth day because of vomiting. Ice-bags were applied to neck and precordium. Fluids forced to 3500 c.c. o. d. by mouth, per rectum, and subcutaneously. Daily colon irrigations. By the eighth day pulse had slowed down to 90 and Lugol's was stopped. All subjective symptoms had disappeared.

Case V.—F. M., age forty-six, No. 61,164.

Chief Complaint.—Rupture, two years' duration.

Family history negative

Past history negative.

Present Illness—Onset about two years ago, with slight sharp pain in left groin on walking any distance or standing long One year ago he first noticed a small lump in that region It was not tender and easily reducible. Truss has been worn for past ten months, with some relief of pain, but without stopping the increase in size of hernia Tenderness has developed. No symptoms of strangulation. No urinary disturbance

Physical Examination.—Essentially negative aside from the local condition and a slight cold. Teeth bad and mild pyorrhea alveolaris. Heart, lungs, and abdomen negative Right inguinal ring admits a finger-tip, but no sac is felt on coughing. Left inguinal ring is about 2 cm. in diameter and there is a distinct bulging on coughing or sitting up. Muscle tone is good.

Laboratory Findings.—Wassermann negative. Urine negative.

Preoperative Course.—After five days in bed on a regular diet his cold has cleared up and he is ready for operation.

Operation.—Repair, using fascial strip from external oblique aponeurosis, left attached at inner pillar, cord transplanted.

Partial Thyroidectomy.—You have the history on the sheets distributed. The patient has improved considerably since he has been in the hospital and we feel that he is in shape for a partial thyroidectomy today.

The blue light in the window is our signal for ethylene. When that is on, we know that ethylene is being given, and there is no possibility of misunderstanding or mistake, and no chance of the cautery being used. Occasionally accidents have

occurred, as you know, due to the use of the cautery and ethylene gas. We use nitrous oxid, analgesia combined with local, but we are trying ethylene now, and so far it has been very satisfactory. We try to give it as light as possible.

His muscles seem rather adherent and do not separate as easily as they usually do, giving the fibrous appearance found in cases treated in the radiotherapy.

I don't hesitate to pack the neck open after it is closed unless the condition is not good enough.

QUESTION: How much gland have you left?

ANSWER: On each side about $\frac{3}{4}$ cm. thick by 1.5 cm. broad

I use a binder on these cases; it serves as well as a big bandage to hold it in place, and it allows the dressing to be changed without any trouble.

After operation we put them on fluids as soon as possible up to a good high figure, put ice-bags to the neck, pericardium, and forehead, and ice-bags are added for every degree of rise of temperature, according to the scheme as worked out by Dr. Crile, in order to control the temperature before it gets out of hand.

SURGICAL DEPARTMENT, CORNELL UNIVERSITY
MEDICAL SCHOOL

CLINIC OF DRS. CHARLES E. FARR AND MARGARET FRIES

CONGENITAL OCCLUSION OF THE BOWEL

CONGENITAL occlusion of the bowel, aside from imperforate anus, is generally considered to be a rather rare phenomenon. A careful perusal of the literature, however, shows that this is by no means true. About 400 cases are on record at present and many others, although recognized, have not been reported Still others, probably in considerable numbers, have been neither recognized nor properly diagnosed. The total, therefore, must be quite large, surely not less than 1000 cases. Such a condition deserves careful study.

Occlusion of the bowel as here considered will be limited to complete occlusion of some segment of the bowel present at birth and situated proximal to the anal canal.

The lesion is generally a complete absence of the bowel over a varying distance, usually situated in the lower ileum, but not rarely in the jejunum or even in the large bowel. The missing portion may be represented by a long, twisted, thread-like tissue without mesentery, or by a small but fairly well-developed bowel, the lumen of which is completely occluded at one or more places. The mesentery in such cases may be well developed, with characteristic vascular loops, lymphatics, etc. The one definite finding is the complete occlusion of the bowel lumen. Naturally the proximal bowel is enormously dilated and hypertrophied.

Case I.—St. Mary's Free Hospital for Children. Female infant four days of age, admitted February 23, 1919.

Chief Complaint.—Lack of bowel movement and vomiting of all nourishment.

History.—The child was a normal birth. There were 2 sisters alive and well The parents were alive and well. *Examination* showed a well-developed, well-nourished child with good color, without evidence of prostration. There was moderate distention of the abdomen, especially in the upper portion The examining finger was able to enter the rectum and met no obstruction A very small amount of slightly brownish mucus was expelled, but no fecal material, no meconium, and no gas. The upper portion of the abdomen was more dilated than the lower, and a diagnosis was made of congenital obstruction of the bowel near the ileocecal valve.

Operation was performed at once under ether anesthesia; the abdomen was opened by a right rectus incision. An enormously distended loop of small bowel appeared to be the cecum, but had no bands, and was readily identified as the lower blind end of the ileum. From this to the ileocecal region ran a thread which was twisted about in a loose fashion and probably represented the missing portion of bowel. There was no mesentery for this portion. The cecum and appendix and large bowel were examined and found normal, but of very small size, about 1 cm in diameter. A lateral anastomosis by suture was made, ileum to ascending colon, using fine chromic catgut followed by silk. The technical difficulties were very great, but an adequate stoma was formed; the abdomen was closed without drainage. The child lived about twelve hours. Postmortem examination showed the anastomosis intact. There was no peritonitis. The child had been unable to take nourishment and there had been no fecal evacuation.

Case II.—New York Hospital, First Surgical (Cornell) Division.

Male infant, eight days of age, was admitted January 6, 1922, with a diagnosis of intestinal obstruction. The parents' complaint was that there had been no bowel movement. The infant took its nourishment regularly and had not vomited. Urine had been passed. Enemas were without result. There was nothing unusual in the family history except that two other

Case III.—New York Hospital, First Surgical (Cornell) Division Female infant, six days old, of normal birth, entered the hospital November, 1922 The parents complained that the baby regurgitated its food at varying intervals and that it had had no movement of the bowels. Of late the vomitus had been fecal in character. The parents were both well and there were other healthy children. No abnormalities existed in the family

Examination showed a well-developed, well-nourished female infant weighing about 6 pounds. The color was good. The pulse was good and the general condition satisfactory. There was no evidence of shock. Nothing abnormal was discovered except a moderate distention of the upper abdomen and right iliac fossa.

Peristaltic waves were seen at times and a definite soft, elastic mass about 6 by 3 cm. appeared occasionally in the right upper abdomen This could be readily seen and felt.

Digital exploration of the rectum was negative A little gray mucus flecked with greenish-brown spots resembling meconium to a slight degree was obtained. An enema of soapsuds was ineffectual. A barium enema was given and under the fluoroscope the barium was seen to pass to the cecum, and, apparently, just a little entered the lower ileum Barium introduced in the stomach revealed a marked pylorospasm. A little, however, did enter the duodenum.

Operation was performed the following day under local anesthesia, novocain 1 per cent. for the skin, 0 5 per cent. for the muscles, aponeurosis, and peritoneum. The anesthesia was very satisfactory. Time of operation one hour. A right rectus incision was made, muscle split. The findings are well depicted in the accompanying drawings made by Dr. W. A. Thompson, who witnessed the operation, and to whom I am deeply indebted for his interest in the case. A complete occlusion of the ileum was present for about 0.5 cm. somewhere about the middle of the small bowel. The upper ileum was enormously dilated and hypertrophied. The lower portion was markedly shrunken, but otherwise normal in appearance, with a good mesentery showing

vessels and lymphatics. The lumen was permeable to a large probe which was passed the entire length at the lower portion and into the large bowel. The cecum and appendix and large bowel were normal except that they were much shrunken. It was deemed unwise to short-circuit this apparently good portion of ileum. A plastic entero-anastomosis was made as shown by the drawings, using fine chromic catgut and silk. An ample stoma was easily made, using one clamp for the distended ileum. The bowel contents could then be readily passed down into the lower ileum and cecum. Closure without drainage. The child left the operating table in excellent condition. There was no evidence of shock. It took a little nourishment. There was no

Fig 246.—Congenital obstruction of ileum in infant seven days old.   (Anna MacNamara, November 18, 1922; Charles E. Farr, M. D)

fecal movement and the child died about twenty-four hours later. Autopsy was not permitted.

Three cases of congenital occlusion of the bowel have been presented, one of each type. Case I showed a long segment of ileum and its mesentery absent. Case II showed multiple occlusions, and Case III a single complete occlusion, but no absence of bowel or marked abnormality of the meso.

Wing and Losee, of the New York Lying-in Hospital, report (personal communication) 24 occlusions of the bowel coming to postmortem, of which 6 only were above the anal segment. Several other operative cases of Wing are not included in this list.

The first case of congenital occlusion of the bowel in the literature was reported in 1733 by Calder.[1] Up to January,

1922, 392 cases have been found The first treatise on the subject was written by Theremin in 1877.[2] His figures are still quoted He found 1 case in 20,000 births in St Petersburg, while Ernst[3] found 2 cases in 41,000 births in the Lying-in Hospital of Copenhagen in 1916.

The sex distribution of this congenital abnormality has not been thoroughly recorded. Of the 57 cases of duodenal atresia collected by Cordes[4] there were 14 males and 13 females. For the remainder the sex was not noted. Of the 95 cases of stenosis and atresia of the large and small intestine collected by Gidionsen[5] there were 38 males and 29 females The sex of the remainder was not noted.

Fig 247 —Congenital obstruction of ileum in infant seven days old. (Anna MacNamara, November 18, 1922; Charles E Farr, M D)

The duration of life in these cases is of considerable interest. If there is simply a stenosis and not an atresia or complete occlusion of the bowel, life may be prolonged indefinitely. Cases are reported existing from four to nine months, thirteen months, and two years. A case of stenosis of the duodenum permitting of the passage of only a small probe lived thirteen months. This case is reported by Cautley.[6] Most cases of complete occlusion die within the first week.

It is remarkable what excellent condition these infants maintain up to the time of death, and this is a positive proof that complete intestinal obstruction in the absence of food and bacterial infection is compatible with life for a prolonged period of time This corroborates the findings of Hartwell and Hoguet[7]

who showed in dogs that **complete occlusion in the absence of infection and necrosis did not result in death** so long as the body fluids could be maintained.

The site of occlusion is of considerable interest. Spriggs[8] found 28 per cent., or 92 cases, in the duodenum 38 per cent., or 124 cases, in the jejunum and ileum; 6 per cent., or 20 cases, in the colon; 8 per cent., or 28 cases, unclassified, and 20 per cent., or 64 cases, were multiple. Krueter,[9] in a total of 194 cases, found duodenal occlusion 58 times, jejunal ileum occlusions 123 times, large intestinal occlusions 33 times. Davis and Poynter[10] in 401 cases found the duodenum involved in 134, the jejunum in
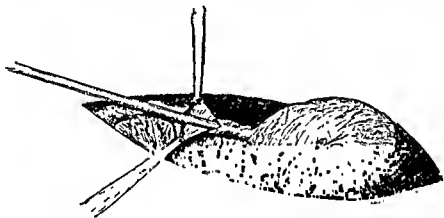

Fig. 248.—Congenital obstruction of ileum in infant seven days old. Anna MacNamara, (November 18, 1922); Charles E. Farr, M. D.)

60, the ileum and cecum in 101, the colon in 39, and multiple occlusions in 67.

Duodenal total occlusions are more frequent than cases of stenosis and are most commonly found near the opening of the common bile-duct (Cordes[4]).

According to Spriggs[8] occlusions may be of two types: first, mere septa composed of the usual layers of the bowel, including the muscular layer; second, complete absence of a segment of the bowel. Most writers disagree with Spriggs and believe there is no such identity as a mere septal occlusion. Spriggs also states that in one-tenth of the cases some other abnormality is present, and in one-half of these imperforate anus or rectum is the deformity or is present with other abnormalities.

The etiology of congenital occlusions of the bowel is a moot question. Many theories have been advanced, which may be classified under three main headings: Error of development, fetal accidents, and fetal disease. Among the errors of development are mentioned snaring at the navel, abnormally long omphalomesenteric duct (case of Douglas), circulatory anomalies, malrotation (mesentery twisted on its axis). Tandler's theory,[11] confirmed by Kreuter, is that the bowel develops by epithelial proliferation, beginning in the duodenum at thirty days and is at its maximum at forty days, ceasing at sixty days He thinks persistent physiologic epithelial obstruction produces the atresia   Bland-Sutton's[12] theory was that atresia exists where an embryologic event takes place   .

Fetal accidents, such as intussusception, volvulus, traction from an inguinal hernia, pressure from new growths, etc, have been advanced as the cause of bowel occlusion The theory is generally abandoned, however, today.

Fetal diseases, such as peritonitis and ulceration, have also been advanced as the cause of bowel occlusion, but definite proof is lacking

The symptoms of congenital occlusion of the bowels are those of intestinal obstruction   They are:

First, vomiting. This is present almost without exception. Helmholtz[13] noted 1 case which did not vomit.   One of the writer's cases also did not present this symptom.

Second, constipation. This is an absolute essential in the diagnosis of congenital occlusion and will be present in all cases of complete occlusion   A very small amount of mucus may be present and gas may be passed if it has been previously introduced by enema or otherwise

Third, distention. This is universally present in all cases of any standing

Fourth, visible peristalsis, not commonly noted in the literature, but was present in all 3 of the writer's cases

Other symptoms, such as congenital icterus, anuria, and marked loss of weight may or may not be present.

The differential diagnosis of congenital occlusion of the

bowel and the site of the occlusion are of extreme interest. If the vomitus contains bile the lesion must be below the ampulla. Theoretically, if vomiting occurs shortly after food intake the lesion is high in the intestinal tract. This symptom must be quite variable, however. A low occlusion would tend to give a greater amount of distention than a high one. The amount of water retained by enema indicates to a certain degree the site of the lesion. The use of the finger in rectal examination will differentiate anorectal obstruction. Normal colored meconium may be present if the occlusion is above the papilla of Vater. Barium injections and barium by mouth give a fair idea of the site of obstruction. This was used in one case by Denzer[14] and in one case by the writer.

The treatment of congenital intestinal occlusion has been extremely unsatisfactory. There are many methods which have been attempted. *First*, enterostomy. This is always unsuccessful. *Second*, gastro-enterostomy for duodenal occlusions. No successful case has been noted where the occlusion was complete. *Third*, anastomosis between the upper and lower segment of the bowel. One successful result has been found in the literature, a case operated by Fockens,[15] showing absence of 4 cm of gut, about the middle and lower thirds of the small bowel. Five months later the child was seen and was well. A successful case of Ernst[16] was also found, but here the condition was stenosis at the duodenojejunal angle. A third case by Rogers on a three-day-old child showed a complete obstruction of the small bowel due to a band. Apparently no intestinal anastomosis was performed. *Fourth*, anastomosis following drainage. No successful case has been reported. *Fifth*, lateral anastomosis in incomplete occlusions without excision of the stenosed area. No successful case is reported.

The essential difficulty in these cases seems to be the inability of the lower segment of bowel to take up normal peristalsis. According to Stockard (personal communication), the lower bowel has never acquired the habit of rhythmic contraction, having been entirely empty throughout fetal life. He advises attempting some method of stimulation of the bowel either by

repeated small enemata or by stimulating the bowel electrically to induce peristaltic action.

Special points of interest in congenital absence of bowel are

First, that occasionally the condition is present in more than one member of a family. Rogers[18] reports 2 cases in one family. The writer presents 3 probable cases in one family. This presents the problem of whether the condition is a fetal accident or a true inherited trait, or a developmental defect. Stockard states (personal communication) that a congenital malformation will result from a disturbed blood-supply or from lessened oxidaton, which amounts to the same thing. It would be very easy to have a malrotation during the development of the mesentery with an entire obliteration of one or more of the branches of the mesenteric vessels. The resulting inadequate blood-supply to the intestine retards its development and consequently at birth there will be one or more errors of development. Moreover, if there is a drag on the mesenteric vessels, there will also be a pull on the sympathetic nervous system which also will retard development.

"This disturbed sympathetic nervous system is very important to consider in the treatment. Although the anastomosis may be perfect, unless the peristalsis of one part of the gut predominates over the other, the operation will be a failure. For this reason it is advisable to stimulate the lower gut by means of water enemata or electricity in the expectation that the strong peristalsis that is started by this means will predominate over the other area. This seems to be the greatest cause for unsuccessful operation other than shock. Again, the prognosis is better in those cases where the undeveloped area is short, as there will not be so great a disturbance in the sympathetic nervous system." (Stockard, personal communication.)

Malformations in the duodenum are in some way associated with the development of the large glands of this region. Many single occlusions of the smaller intestine are referred to Meckel's diverticulum. If volvulus causes any of these occlusions no sign of it remains at the time of birth.

Dr. Martha Wollstein, in a personal communication to one of us, stated that both duodenal and ileal atresias are due to the same cause. There is a twist or malrotation of the mesentery which disturbs the blood-supply leading to the gut. The end-result is poor development of that piece of intestine. She does not agree with Spriggs in believing that there could be a septum only across the bowel. She believes that with all complete occlusions there must be blind ends to the bowel.

Conclusions.—Congenital occlusions of the bowel have been shown to be quite common. They are probably very frequently overlooked. The etiology is unknown, but is probably a developmental defect. The diagnosis is quite easy. The site of the lesion is not so easily arrived at. The treatment is anastomosis. The end-results so far have been very discouraging. It is probable they always will be.

BIBLIOGRAPHY

1. St. Luke's Hospital Annual Report, vol ii, p. 63, 1910
2. Theremin: Deutschr. f. Chir., 1877, viii, 34.
3. Ernst, N. P.: Brit Med. Jour., 1916, p. 644, May
4. Cordes, L.: Congenital Occlusion of the Duodenum, Arch. of Ped., 1901, June, vol. xviii, No 6, p. 401.
5. Gidionsen, H.: Ueber die Congenitalen Stenosen und Atresien des Darmes, 1898.
6. Cautley, E.: Brit. Jour. Child. Dis., 1919, xvi, 184.
7. Hartwell and Hoguet: Jour. Amer. Med. Assoc., June, 1912.
8. Spriggs, N. I.: Congenital Occlusion, Guy's Hosp. Rep., 1912, lxvi, 143.
9. Kreuter, Erwin: Die Angeborenen Verengerungen und Verschliessungen des Darmkanals, 1905.
10. Davis, D. L., and Poynter, C. W. M.: Surg., Gyn., and Obst., 34, 35, 41, January, 1922.
11. Tandler, Jul. Morphologisches Jahrbuch, 1902, ed. 29, p. 187, Zur Enterricklungs Geschichte des Monschlicken Duodenum in Fruhen Emryonalstadien.
12. Bland-Sutton, J. B.: Amer. Jour. Med. Sci., N. S., xcv, iii, 457, 1889.
13. Helmholtz: Johns Hopkins Hosp. Bull., Baltimore, 1907, xviii, 370.
14. Denzer, B. S.: Congenital Duodenal Obstruction: Malrotation of the Intestine, Amer. Jour. Dis Child, December, 1922, p. 534.
15. Fockens, P.: Zentralbl. and Chir., 1911, p 532.
16. Rogers: Successful Operation for Intestinal Obstruction in an Infant Sixty-four Hours Old, Amer Trans Col. State Med. Soc., 1897, p. 422.

Additional:

Ballantyne: Antenatal Pathology and Hygiene, vol 2, p. 532, 1905.

St. George, A.: Congenital Intestinal Obstruction, Amer. Jour. Dis. Child., May, 1918, p. 354.

Kretuer, E.: Zur Aetiologie der Congenitalen Atresien des Darms and Oesophagus, Arch. f. Klin. Chir., 1909, Bd 83, p. 303.

Pfaundler and Schlossman: Handb. der Kinderh. Part I, ed. 1, 1906, p. 72.

Clogg, H. S.: Lancet, London, 1904, ii, 1770.

Wertheimer, M.: Occlusion Congenitale L'Intestine Grêle, Lyon Med., 1920, p. 570.

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